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PLANNING GUIDE FOR WASTEWATER CLUSTER SYSTEMS IN ILLINOIS

Document No. 84/01

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Illinois Department of
Energy and Natural Resources

James R. Thompson, Governor
Michael B. Witte, Director

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PLANNING GUIDE FOR WASTEWATER CLUSTER SYSTEMS IN ILLINOIS

by

Richard Helm, James Quinn [1)]
Walter Zyznieuski [2)]

Project No. 84/2002

James R. Thompson, Governor
State of Illinois

Michael B. Witte, Director
Illinois Department of Energy
and Natural Resources

[1)] Performed under contract with the Illinois Department of Energy and Natural Resources as contract number WR 33 to Randolph and Associates, Peoria, Illinois

[2)] Contributing author with the Illinois Department of Energy and Natural Resources

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PREFACE

This report has been prepared for the Illinois Department of Energy and Natural Resources as Phase 1 of a wastewater cluster system study under Contract No. WR32. The report was prepared by Randolph & Associates, Inc., with assistance by Urban Systems Research & Engineering, Inc., Cambridge, Massachusetts. Phase 2 of this project, model ordinances, was prepared under Contract No. WR33 and incorporated into this report as additional appendices.

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Recognition is also expressed to the subconsultants who assisted in this study. Patricia Deese, Susan Farrell, and Peggy Jensen of Urban Systems Research and Engineering, Inc., completed the literature review and offered helpful review comments on the entire report. Michael Tibbs of Clem and Triggs, P.C., assisted in preparation of the model ordinances and review of the legal aspects of the ordinance.

Stephen John is acknowledged for his efforts in preparing the research proposal for this project, and special thanks are expressed to Sandra Eberle for her patience in preparing the manuscript.

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EXECUTIVE SUMMARY

This report has been prepared to provide information which would assist regulatory agencies, planning agencies and developers in formulating policies and procedures for planning, managing and regulating wastewater cluster systems in Illinois.

Cluster systems are an intermediate wastewater treatment option between individual on-site systems and conventional centralized collection and treatment systems. While conventional systems are usually cost-effective for large communities and individual on-site systems are cost-effective for isolated rural residences, cluster systems often are the best solution for situations in between such as small unsewered communities, urban fringe areas and low-density urban subdivisions.

The report introduction defines cluster systems, discusses the need for cluster systems, and describes some of the problems which must be overcome in order for clusters to become a readily implementable approach for wastewater treatment and disposal. Chapter Two discusses the state laws and regulations which apply to cluster systems and describes the federal funding possibilities for certain cluster systems under the municipal wastewater construction grants program. Chapter Three describes the technology of cluster system components

and how these components may be combined into a total system. A case history of a typical cluster system serving an Illinois community is also included.

Chapter Four points out the importance of establishing authority for managing, financing and regulating cluster systems. Critical aspects of administering cluster systems were discussed along with optional approaches which have been utilized. Chapter Five presents some of the major issues associated with use of cluster systems. A review panel was formed to address these issues from different viewpoints. The review comments were then incorporated into the issue discussions, and recommendations for resolving the issues were developed.

Model ordinances were developed as a guide for implementing and regulating cluster systems. The ordinances include a wastewater disposal zone ordinance, a cluster system sewer use ordinance, and an ordinance regulating construction of planned cluster systems. The model ordinances are presented in Appendix E and also are available separately from the Illinois Environmental Protection Agency or Illinois Department of Public Health.

In considering the potential needs, benefits or risks associated with cluster wastewater systems, the distinction between retrofit and planned cluster systems must be made. Retrofit systems are cluster systems which serve homes which are already in place. Planned systems are built for new developments. While both types of cluster systems utilize the same technology, the approach and procedures for

implementation are different. Thus, in summarizing the major considerations for cluster systems, we have discussed each system separately.

Retrofit Cluster Systems

In assessing the desirability of cluster systems, consideration should be given to the following:

Needs and Risks;
Planning, Funding and Legal Issues; and
Long-Term Economic/Land-Use Impacts.

For retrofit systems, a need for wastewater improvements clearly exists if the existing wastewater facilities (usually on-site septic systems) are not performing adequately. In Illinois there are over 600 communities with populations under 1,000 persons. Many of these communities are unsewered or served by septic tanks discharging to field tiles. Often the on-site systems cannot be upgraded because of small lots or unsuitable soil conditions. For these small communities, conventional sewers and centralized treatment plants usually impose an unreasonable financial burden on the residents. This leaves cluster systems as the only cost-effective approach for these situations. Since cluster systems usually require a minimum of mechanical components, the risk of failure is generally less than with a conventional mechanical treatment plant, and if a problem does occur, it would affect only houses on that particular cluster rather

than the entre community. Likewise, the level of operator attention and management effort for clusters is generally less than for conventional systems, although greater than that required for individual on-site systems.

If a retrofit cluster system is demonstrated to be the most cost-effective wastewater alternative, then U.S. Environmental Protection Agency (EPA) funding under the municipal construction grants program is available to pay the majority of the construction costs. The planning should be done in accordance with EPA requirements for Facilities Plans, just as it would be for conventional wastewater facilities. Existing manuals and reports are available which provide detailed planning guidance for retrofit cluster systems.[54,57,80]

All the required legal authority exists under current Illinois statutes and regulations to implement a retrofit cluster system. The retrofit systems approved to date in Illinois have been in small municipalities where municipal disposal zones have been established. Where portions of the service areas were outside municipal boundaries, additional easements have been obtained to assure rights of access to pretreamtent units located on private property. Sanitary districts or public water districts could be formed instead of municipal disposal zones provided that easements are obtained to assure rights of access.

The major existing obstacle in implementing a retrofit cluster system results from the dual regulatory role of the Illinois Department of

Public Health (IDPH) and the Illinois Environmental Protection Agency (IEPA). Although there is a clear delineation of responsibilities based on flows and type of discharge, the design requirements of the two agencies differ. Depending on the type or combinations of cluster systems proposed, one community may be required to work with both agencies for different parts of its system, or the same treatment concept may be subject to different standards depending on the number of homes serviced. Recently, there have been some changes which would make the requirements more uniform (such as the IDPH proposed change in surface discharge limits). Still, differences remain in other key areas. In addition to differences in existing requirements, there is a lack of design standards for system components used in clusters as opposed to individual on-site systems or conventional systems. To resolve these problems and streamline implementation of cluster systems in Illinois, we recommend a joint panel be formed with representatives of IDPH, IEPA and consultants experienced in cluster system design. The goal of the panel would be to develop uniform policies and standards for approving and regulating cluster systems in Illinois.

If a retrofit cluster system has been selected as the most cost-effective solution for serving a community or subdivision, the long-term economic and land use implications should also be considered. A retrofit system normally serves existing residential areas. Where anticipated growth is minimal, cluster systems should not pose any special limitations over other wastewater options; however, if a community is planning for substantial business or

industrial growth, clusters may restrict development more than conventional systems. Where a small community is near an existing collection system, use of clusters could have a significant long-term land use impact. Extending the existing collection system to serve the community would accelerate development of open land along the connecting sewer, whereas a cluster system would not encourage that development. This impact can be viewed as either positive or negative depending on the land use goals of the communities involved.

Planned Clusters

The considerations discussed above are equally important for planned cluster systems, but the evaluation of these factors is substantially different in the context of planned clusters.

The need for planned clusters is based more on optimum land use practices and developer preference rather than correction of existing water pollution or health-related problems. The review of specific planned cluster systems revealed none located in Illinois. This could suggest that a need for planned clusters has not been clearly demonstrated. On the other hand, if retrofit clusters appear to be the best solution for some existing situations, if would follow that planned clusters would have been a preferable wastewater approach at the time of initial development in those locations. Ultimately, the incentive for planned clusters rests with the developer. If the developer can enchance his profit potential or opportunities for a successful project, planned clusters will be a desirable alternative.

For example, smaller lot size could allow concentration of development in a portion of the site balanced by open spaces for cluster treatment, with a reduction in overall development costs. Or, where part of a development has steep wooded lots unsuited to on-site systems, cluster systems could allow better utilization of the entire site.

The planning, funding and legal issues are more complex for planned clusters than for retrofit clusters. One major difference is funding. Since public monies cannot fund private development, no construction funding is available for planned clusters through the EPA construction grants program. Unlike individual systems which are funded by each homeowner at the time of construction, planned cluster systems must be funded by the developer at the time of initial development. This increases the initial investment required by the developer. The capital funding problem can be reduced somewhat by using smaller cluster systems installed in phases as the development progresses.

Another problem in implementing planned clusters is establishing a management authority. If the new development is outside existing municipal or district boundaries, a municipal disposal zone, public water district or sanitary district cannot be formed because there are no existing residents. This leaves only the developer as a responsible party. Past experience with developer-operated treatment systems has made regulatory agencies reluctant to accept such an

arrangement. This difficulty can be overcome if public health, pollution control, and local zoning and planning authorities work together to accomplish the following:

1. Develop uniform design and construction requirements for cluster systems.

2. Formulate policies and legal mechanisms which would provide an effective means to transfer the management, financial and legal responsibility for planned clusters from the developer to a responsible management authority for financing and overseeing operation and maintenance of the system. While homeowners associations can fill this role, a public authority such as a sanitary district would be preferable.

In terms of long-term land use impacts, planned clusters could result in a higher population density than would occur with individual on-site systems. If this is considered undesirable, then overall density requirements could remain the same with smaller lot size offset by open space requirements.

In summary, both retrofit and planned cluster systems provide a feasible wastewater alternative which is appropriate for intermediate situations where neither conventional centralized systems, nor individual on-site systems are ideal solutions. If the regulatory agencies and other responsible parties work together to overcome the

obstacles to cluster system planning and implementation discussed in this report, then both retrofit and planned clusters can be utilized where appropriate in Illinois.

WASTEWATER CLUSTER SYSTEMS

1.0 INTRODUCTION

Septic tanks and other individual on-site systems are generally considered the most appropriate technology for wastewater service to isolated residences or suburban subdivisions where conventional sewer systems are not available. However, due to unsuitable soil conditions or neglect by homeowners, many of these systems have eventually malfunctioned resulting in possible contamination of surface water or groundwater. Consequently, increasing efforts have been made by engineers, developers and regulatory authorities to serve these subdivisions and rural communities with conventional gravity sewer collection systems and centralized treatment plants wherever possible. This trend toward conventional systems was further encouraged by the construction grants program and other federal funding programs which did not allow funding for on-site systems.

In recent years, this trend has begun to reverse, and the widespread belief that conventional sanitary sewers could and should be constructed in nearly every rural community and suburban subdivision has given way to a recognition that decentralized wastewater systems, in some instances, may be preferable in both economic and environmental terms. The Clean Water Act Amendment of 1977 and subsequent U.S. Environmental Protection Agency regulations defined individual systems serving single homes or groups of homes as

alternative technology eligible for 85 percent construction grants under the innovative and alternative (I/A) program. U.S. EPA has actively promoted the appropriate use of small alternative wastewater systems (SAWS) by sponsoring research and demonstration projects, publishing planning and design manuals, and conducting technology transfer seminars. In December, 1980, U.S. EPA's Office of Water Program Operations published "A Strategy for Small Alternative Wastewater Systems" with the goal of developing "a comprehensive planning and management approach to promoting the use of and improving the performance of SAWS."

The State of Illinois has been in the forefront of efforts to apply SAWS concepts to solve pressing water pollution and public health problems in small communities. The Illinois Environmental Protection Agency (IEPA) developed guidelines for evaluating individual systems in wastewater facilities plans. Through both the Section 208 Water Quality Management Planning Program and the Section 201 Construction Grants Program, IEPA has explored the potential of small alternative systems for economically achieving water quality objectives. IEPA staff helped draft enabling legislation for formation of wastewater disposal zones in Illinois to facilitate implementation of SAWS projects. One SAWS concept which offers much potential for filling the gap between conventional systems and individual septic systems is the wastewater cluster system.

1.1 Definition of Clusters

The term "cluster systems" encompasses a range of wastewater disposal options between individual on-site systems and conventional centralized collection and treatment. The exact definition of cluster systems varies from state to state. U.S. EPA defines cluster systems as "two or more users on one alternative system." The alternative systems generally involve expansion of traditional on-site wastewater technologies such as septic tank-soil absorption systems (ST-SAS) to handle more than one home simultaneously.

For the purposes of this study, cluster systems are defined as systems that serve more than one residence or building and consist of either:

(1) group or individual on-site pretreatment units followed by a common "alternative treatment" system such as subsurface disposal or submerged sand filters, or

(2) individual on-site pretreatment units followed by an alternative collection system leading to any type of treatment system.

An example of the first type of cluster system would be a group of homes all served by the same septic tank and soil absorption system. An example of the second situation would be individual septic tanks at each building connected by small diameter gravity sewers to a lagoon system for treatment.

An additional distinction is made between retrofit cluster systems which are either new or upgraded and designed for homes that are already in place and planned systems which are built with new residential development.

Also inherent in the cluster concept is maintenance of the system by some responsible management entity other than an individual home owner. This may be a unit of government, an incorporated owners' association, or private utility.

1.2 Need for Clusters

Cluster systems can be a cost-effective alternative to centralized wastewater treatment and disposal in small communities or small residential areas isolated from central facilities. Cluster systems also offer a potential solution for subdivisions which are too densely developed or where conditions prohibit individual on-site disposal systems on each lot. The need for cluster systems applies to both existing situations and future development.

Currently, over half a million Illinois households are served by on-site private sewage systems. Many of these are in rural communities and urban fringe subdivisions. Many have failed seepage systems or illegal discharges creating nuisance conditions, health hazards, and pollution of surface and groundwater resources. During the past decade, concerted efforts have corrected many of these problems through sewer extensions or enforcement of private sewage

regulations. The remaining problems tend to be less amenable to these traditional solutions because of technical, economic and institutional constraints.

For many of these existing problems, retrofit clusters may provide a practical solution. For example, in developed areas experiencing septic system failures, many of the on-site systems may function well. Some of the failures may be correctable on site by relatively inexpensive means, but a small percentage of the lots may be unsuitable, due to lot size or soils or both for on-site disposal. A wastewater cluster system serving these problem lots may eliminate the need to sewer the entire area.

Future development must also be served by appropriate wastewater facilities. A 1980 ENR study estimated that 25,000 new on-site systems are constructed each year in Illinois.[35] Many more new buildings are served by extending interceptors and collector sewers. However, local conditions may rule out both on-site disposal and conventional sewerage. In unsewered areas, soil may be unsuited to subsurface disposal, or the desired development density may preclude use of individual septic systems. In sewered communities, sewering a particular development may be unfeasible or undesirable: unfeasible because of topography or overloading of existing facilities; undesirable because of adverse environmental, fiscal or land use impacts of sewer extension. The tightening of public health and water

pollution regulations in recent years has created conflicts among development interests, municipalities and regulatory agencies over wastewater and land use issues.

Planned cluster systems could help resolve these conflicts. For example, in areas without public sewers, developers are often faced with a dilemma. Portions of a proposed subdivision site may have soils suitable for subsurface disposal, while other portions are marginal or clearly unsuitable. The developer could try to obtain local approval of on-site systems in the poor soils areas, leaving the lot buyers and health department to deal with premature septic system failures. In years past, a small package treatment plant might have been used in this circumstance; however, since 1980, IEPA regulations have disallowed use of package plants (under 0.25 MGD) because of problems with reliable operation and maintenance of these systems. As an alternative to these options, a cluster system could be constructed with multi-home seepage fields in the suitable soils. Since individual on-site systems are not used, lot sizes may be reduced allowing the same number or even more lots despite the land set aside as the cluster site. Furthermore, this site may provide recreational open space as well as wastewater disposal.

Thus, there is a clear and pressing need for innovative techniques of wastewater management in unsewered areas, and wastewater clusters can help to fill this need. However, as the remainder of this discussion

will demonstrate, there are numerous technical, economic and institutional issues which must be addressed for clusters to become an implementable approach.

1.3 Gaining Acceptance of Clusters

The widely held attitude that centralized collection and secondary treatment is the only permanent approach to wastewater management can be the biggest obstacle to planning a cluster system. Political leaders often make the assumption that economic development and "progress" are tied to centralized wastewater treatment. In some parts of Idaho for example, the county board of supervisors has made public statements against the long-term use of cluster systems.[161] Regulatory agencies are often reluctant due to health and safety concerns. If agencies do allow on-site disposal, they will often prohibit cluster systems or any alternative technology such as aerobic pretreatment for fear the systems will not work due to improper design or inadequate maintenance.[174,175] Another obstacle is that engineers in the area may have limited experience with cluster system design and do not consider clusters as an alternative.[59] Finally, citizens may object to maintenance requirements of cluster systems.

Education can overcome these obstacles. Past experience has shown that citizens will accept cluster systems when they learn about the comparative cost savings.[59,159,163,170,] Regulatory agencies will allow clusters in appropriate applicatons if competent designers work

closely with staff members to address their concerns and help develop design guidelines.[76,162,175,176,] This occurred in Idaho as well as Birmingham, Alabama, and Downington, Pennsylvania.

Another aspect which can impact the acceptance of retrofit cluster systems is the distribution of costs and benefits among the participants. Some community members might reject the cluster system if they see that more money is being spent on their neighbor's homes than their own. For example, septic tank effluent pumps in Cuyler, New York, were designed for 220 volt electrical service. Some houses had to be rewired to provide this service. The majority of the community who was paying the same user fee but not getting the free rewiring objected to the unfair distribution of benefits, and almost rejected the system. They agreed to accept it after realizing that inequities also existed in other less obvious areas such as the length of collection system to each house. A similar situation arose in Cromwell, Minnesota, when some residents complained about not getting new septic tanks.[159]

Gaining homeowners' acceptance of planned systems is usually not a problem; however, it is essential that the homeowners are aware of their wastewater management responsibilities.[162,177] There have been cases where second owners of homes have balked at the idea of cluster systems and the need to pay the fee. In one system in Boise, Idaho, the O&M staff handled the problem by threatening to turn off the wastewater pump, and explaining that the homeowner's only other

option was hiring a honey wagon daily.[162] In other on-site management districts, the management agency has the power to shut off water to the house.[76]

1.4 Study Objectives

The broad objective of this report is to improve the use of water and land resources in the State of Illinois by expanding the range of available wastewater management options to include wastewater cluster systems. Specific objectives of the study are to:

1. Review the existing Illinois laws and regulations which may affect the use of wastewater cluster systems.

2. Provide information on the current cluster system technology and identify potential applications of cluster systems in Illinois.

3. Discuss considerations related to the management of clusters and provide guidance for effective implementation and management of cluster systems.

4. Identify the key issues associated with the use of cluster systems and discuss approaches for resolving these issues and incorporating cluster concepts into wastewater and land use plans.

5. Develop model ordinances for use by local governments in regulating both retrofit and planned clusters. The ordinances will address the specific needs of IEPA for implementing cluster systems under the wastewater construction grants program.

2.0 APPLICABLE LAWS AND REGULATIONS

There are five major Illinois statutes which are applicable to wastewater cluster systems:

1. Environmental Protection Act
2. Private Sewage Disposal Licensing Act
3. Municipal Wastewater Disposal Zones Act
4. Sanitary District Acts
5. Public Water District Act

In addition to these state laws, the Federal Clean Water Act Amendments of 1977 and 1981 are applicable for funding eligible cluster system projects.

The Environmental Protection Act establishes the authority of the Illinois Environmental Protection Agency (IEPA), the Illinois Pollution Control Board (IPCB) and the Illinois Department of Energy and Natural Resources (ENR).

Under the Water Pollution Control Rules adopted by IPCB, the IEPA is responsible for issuing permits whenever the sewage flows exceed 1,500 gallons per day and there is a surface water discharge. For a private subsurface sewage discharge or anything under 1,500 gallons per day, the Illinois Department of Public Health (IDPH) is the responsible regulatory authority under the Private Sewage Disposal Licensing Act.

The Municipal Wastewater Disposal Zones Act is enabling legislation which allows the formation of on-site wastewater disposal zones within incorporated muncipalities.

The Sanitary District Acts and Public Water Districts Act provide for the formation of public districts which have the authority to construct wastewater treatment systems. Unlike the municipal disposal zones, these public districts may include unincorporated areas.

A source list of these acts and their related rules and regulations have been included for reference in Appendix A. The following paragraphs discuss each act in relation to cluster systems.

2.1 Environmental Protection Agency

On July 1, 1970, the Illinois Environmental Protection Act became effective. The Act "established a unified, state-wide program supplemented by private remedies, to restore, perfect and enhance the quality of the environment, and to assure that adverse effects upon the environment are fully considered and borne by those who cause them." Under the Act, the Environmental Protection Agency (IEPA), the Pollution Control Board (IPCB), and the Institute of Environmental Quality, now known as the Department of Energy and Natural Resources (ENR), were created.

Section 4, Paragraph b, of the Environmental Protection Act states that the IEPA "shall have the duty to collect and disseminate such

information, acquire such technical data, and conduct such experiments as may be required to carry out the purposes of this Act, including ascertainment of the quantity and nature of discharges from any contaminant source and data on those sources, and to operate and arrange for the operation of devices for the monitoring of environmental quality."

Section 5, paragraph b, states that the IPCB "shall determine, define and implement the environmental control standards applicable in the State of Illinois and may adopt rules and regulations in accordance with Title VII of this Act."

The IPCB adopts rules and regulations pursuant to the authority contained in Sections 11 and 13 of the Environmental Protection Act which authorizes the Board to issue regulations "to restore, maintain and enhance the purity of the waters of this State in order to protect health, welfare, property and the quality of life, and to assure that no contaminants are discharged into the waters . . . without being given the degree of treatment or control necessary to prevent pollution;" to adopt water quality standards, effluent standards, standards for the issuance of permits, standards for the certification of sewage works operators, standards relating to water pollution episodes or emergencies, and requirements for the inspection of pollution sources and for monitoring the aquatic environment; and which directs the Board to adopt requirements, standards and procedures which will enable the state to implement and participate in

the National Pollutant Discharge Elimination System (NPDES) established by the Clean Water Act (33 USC 1251 et seq.).

The Illinois Water Pollution Control Rules were first adopted by the Pollution Control Board on March 7, 1972, and have subsequently been amended several times as of March 18, 1983.

2.2 Private Sewage Disposal Licensing Act

The IDPH is required under the Private Sewage Disposal Licensing Act (IL Rev. Stat. 1979, ch 111 1/2 sections 116.301 through 116.324) to license private sewage disposal contractors and to establish and enforce a minimum code of standards for design, construction, materials, operators, and maintenance of private sewage disposal systems for the transportation and disposal of wastes therefore and for private sewage disposal systems servicing equipment.

Paragraph 116.307 in the Private Sewage Disposal Act gave IDPH the authority to specifically promulgate and publish a Private Sewage Disposal Code. The following articles are covered in the Sewage Disposal Code:

1. Definitions
2. General Requirements
3. Approved Private Sewage Disposal Systems
4. Septic Tanks
5. Distribution Boxes

6. Subsurface Seepage System Requirements
7. Buried Sand Filters
8. Recirculating Sand Filters
9. Waste Stabilization Ponds
10. Aerobic Treatment Plants
11. Surface Discharges
12. Disinfection
13. Human Waste Disposal
14. Holding Tanks
15. Sanitary Dump Stations
16. Swimming Pool Wastewater
17. Servicing, Cleaning, Transportation, and Disposing of Wastes from Private Sewage Disposal Systems
18. Minimum Performance Standards for Private Sewage Disposal Contractors

Rule 2.02 of the Private Sewage Disposal Code states that the use of a private sewage system to serve more than one property is prohibited except where a common property is provided under joint ownership of the users, or where the system is under public jurisdiction or arranged by a district established for the maintenance of such systems. This rule appears to allow the use of a wastewater cluster system if it is managed properly.

Under the code, the following systems are approved for private sewage disposal when designed, constructed, operated and maintained in accordance with this code:

A. Septic tank or Imhoff tank followed by:

   1. Subsurface seepage field
   2. Seepage bed
   3. Seepage pit
   4. Sand filter (buried or recirculating)
   5. Waste stabilization pond

B. Aerobic treatment plant discharging to supplementary treatment or to the surface, as provided in Articles X and XI.

C. Waste stabilization pond.

D. Privies, chemical toilet, recirculating toilet, incinerator toilet, compost toilet.

E. Any other system for which a variance in accordance with Rule 2.10 has been issued or for which an experimental permit in accordance with Rule 2.11 has been issued.

All other systems or components are not approved.

Sewage sludge from septic tanks may be disposed of on land, in a municipal sanitary sewer system, in a sludge lagoon or drying bed, in an incinerator, or in a sanitary landfill. Rule 17.04 of the Private Sewage Disposal Code outlines and describes the required rules to be followed when septage is disposed of by any of these methods.

Under Paragraph 116.309 of the Private Sewage Disposal Licensing Act, the IDPH may designate and use full-time municipal, district, county or multiple county health departments as its agents in the administration and enforcement of this Act. In addition, this Act

does not prohibit enforcement of ordinances of local government which establish a system for regulation and inspection of private sewage disposal contractors and minimum standards for design and construction, provided such ordinances establish a system which is at least equal to state regulations. Figure 2-1 shows IDPH's Regional office locations. Appendix B lists the phone numbers and addresses of all units of local government in the state which administer a private sewage disposal program.

2.3 Municipal Wastewater Disposal Zones Act

IL Rev. Stat. 1979 chapter 24 paragraph 1402 describes the formation of an on-site wastewater disposal zone. Only corporate authorities of any city, village, or incorporated town may form on-site wastewater zones. The purposes of forming an on-site wastewater disposal zone are outlined in paragraph 1403:

> "An on-site wastewater disposal zone may be formed for the following purposes:
>
> (a) to collect, treat, reclaim, or dispose of wastewater;
>
> (b) to acquire, design, own, construct, install, operate, monitor, regulate, inspect, rehabilitate, modify, and maintain existing and new on-site wastewater disposal systems within the zone in a manner which will promote environmental quality, prevent the pollution, waste, and contamination of water, abate nuisances, and protect public health;
>
> (c) to conduct investigations, make analyses, and monitor conditions with regard to water quality within the zone;
>
> (d) to apply for, obtain, and utilize federal and State funds for any of the purposes specified in this Act;
>
> (e) to adopt and enforce reasonable rules and regulations necessary to implement the purposes of the zone. Such rules and regulations may be adopted only after the corporate

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
Division of Engineering
TELEPHONE OR ADDRES INQUIRIES TO THE
REGIONAL OFFICE SERVING YOUR AREA

REGION 1 – Rockford
Roger Ruden, R.E.
Ill. Dept. of Public Health
4302 N. Main Street
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Ill. Dept. of Public Health
2125 South First Street
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Robert Flygare, R.E.
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245 Roosevelt Rd. Bldg. #5
West Chicago, IL 60185
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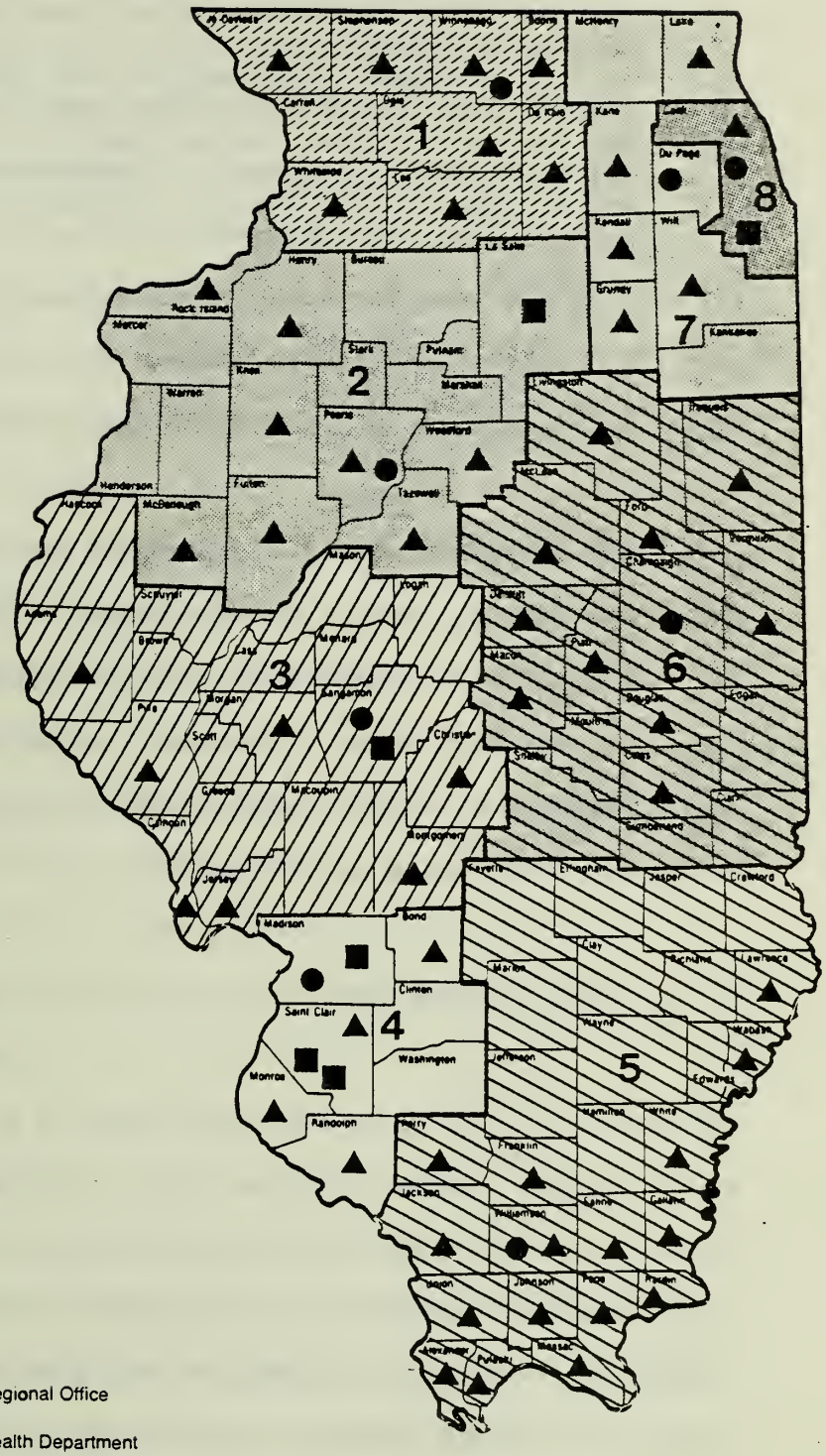
REGION 8 – Berkeley
Paul Levin, R.E.
Ill. Dept. of Public Health
5813 Elm Avenue
Berkeley, IL 60163
Phone 312/449-2777-9, 2870



CENTRAL OFFICE
Ill. Dept. of Public Health
Office of Health Regulation
Division of Engineering
535 West Jefferson Street
Springfield, IL 62761
Phone 217/782-5830

● IDPH Regional Office

▲ Local Health Department Administering a Private Sewage Disposal Program

■ Other Local Authority For the Private Sewage Disposal Program

Figure 2-1 Illinois Department of Public Health - Regional Offices

authorities conduct a public hearing after giving public notice in a newspaper of general circulation within the municipality;

(f) to contract for the exercise of any of the aforementioned powers even if any such contract shall extend for longer than one year; and

(g) to impose a tax upon all real property located in the zone for the purpose of retiring bonds issued pursuant to Section 6 of this Act, paying the costs of construction, operation, and maintenance of the wastewater disposal system, and to impose a user charge to defray the costs of routine operation and maintenance."

For all muncipalities requesting construction grant funds for a retrofit cluster system, public ownership of property or sufficient rights of access must be provided to assure undisturbed use and operation for the estimated life of the project. To meet this objective, the IEPA normally requires the formation of an on-site wastewater disposal zone. The main reason for this rule is so that the municipality can retire bonds, pay the costs of construction, operation, maintenance and replacement of the wastewater disposal system, and impose a user charge to defray the costs of routine operation, maintenance and replacement.

2.4 Sanitary District Acts

Beginning with the Chicago Sanitary District Act of 1889 up through the Metro-East Sanitary District Act of 1974, several different sanitary district acts have been approved by the State of Illinois for regulating the formation of these districts under different situations. Over 30 such districts have been established under the provisions of those statutes. Most of the existing districts were formed under the Sanitary District Act of 1917 (Ill. revised Statutes, Chapter 42, paragraph 298.99 through 319).

Paragraph 299 of the Sanitary District Act of 1917 provides that whenever any area of contiguous territory containing part (or all) of one or more incorporated municipalities, situated such that a common sewage treatment plant or drainage outlet could serve the area, a sanitary district may be established. A properly executed petition signed by 100 legal voters within the proposed district will put the issue on the ballot, and if the majority of the votes cast are in favor, the district is formed. The existing districts range in size from 750 persons served to over 5,000,000 served.

Thus, it appears that a sanitary district could be formed to construct and operate a wastewater cluster system serving a fairly small geographic area. However, because of the requirement for existing residents to petition for formation, it might be impracticable to establish a sanitary district to provide cluster systems for planned, new developments. For an existing subdivision desiring cluster wastewater treatment, formation of a sanitary district could provide the means for implementing the required planning, construction and operation of a cluster system.

2.5 Public Water Districts Act

The Public Water Districts Act (Illinois Revised Statutes, Chapter 111-2/3, paragraphs 188 through 212.16) was approved by the legislature on July 25, 1945, to provide for the formation of districts to provide a public water supply to serve the districts. The requirements for forming a public water district are similar to

those of a sanitary district except that the district boundary does not need to include any portion of an incorporated municipality.

Added by amendment to the Act in 1951, Paragraph 210 authorizes every public water district to acquire or construct and to operate and maintain "sewerage properties" in addition to water systems. The term "sewerage properties" is defined to include treatment plants, sewers, drains, combined sewers, force mains, pump stations, and all other appurtenances necessary for collection, treatment, and disposal of sewage and industrial wastes.

Thus, where there is a need to provide both water and sewer services, formation of a public water district may be an appropriate mechanism to implement a wastewater cluster system. A public water district could be established in a rural subdivision which could not establish a sanitary district because no part of the district lay within an incorporated municipality. As with sanitary districts, a public water district may be impracticable for planned new developments since it must be formed by existing residents.

2.6 Clean Water Act and Amendments

The Federal Clean Water Act of 1977 (33 U.S.C. 466 et.seq.) first established a provision for funding Innovative/Alternative (I/A) Technology projects at a higher level than conventional technology, defined I/A technology to include on-site treatemnt systems, and required a set-aside of 2 percent of each state's allotment be used to

increase the federal share from 75 percent to 85 percent for I/A projects. The 1981 Amendments (P.L. 97-117) extended the construction grants program through September 30, 1985, with the federal share remaining at 85 percent for I/A projects through September 30, 1984, then dropping to 75 percent after that date. Additional changes in the 1981 Amendments which provided further incentives for I/A projects included:

1. Funding for conventional projects was reduced to 55 percent after September 30, 1984;

2. Funding of collector sewers was eliminated after September 30, 1984;

3. The mandated I/A set aside was increased to a minimum of 4 percent of each state's allotment.

In general, federal funding is not available for planned cluster systems to service future developments; however, if a retrofit cluster system is used to correct existing wastewater problems, federal construction grant funds may be utilized. Thus, retrofit cluster systems are generally eligible for U.S. EPA innovative/alternative technology grants at 85 percent of eligible construction phase costs through September 30, 1984, and at 75 percent of eligible costs after that date.

Within the Construction Grants program, it is important to distinguish

between those provisions that affect alternative technology, and those that affect individual treatment systems, and how both of these affect the various kinds of cluster systems.

STEP, grinder pump and small-diameter gravity collection are all considered alternative forms of collection. As such, they are eligible for 85 percent federal funding, and may be selected even if 15 percent more expensive than the most cost-effective conventional collection system.

In U.S. EPA regulations and guidance, cluster systems consist of alternative collection systems with treatment only by subsurface disposal. Within this limited definition, they are considered to be a unitary form of treatment and not subject to separate priorities for collection and treatment.

Within the regulations and guidance, individual treatment systems are defined as privately-owned systems serving permanent residents. An individual septic tank and filter field would be an example of such a system. Associated with the funding of such system are certain requirements for access, control and maintenance.

Although cluster systems may use various forms of on-site pretreatment (septic tanks, STEP or grinder pumps) this does not mean that those

systems are subject to various requirements for individual treatment systems. Clusters are considered to be intrinsically publicly owned, so that service even to seasonal residents is an allowable cost.

3.0 DESCRIPTION OF CLUSTER SYSTEMS

The discussion that follows will be organized according to cluster system component parts: 1) source control, 2) pretreatment, 3) collection, and 4) treatment. Following the description of cluster components, there is a discussion of total systems and potential applications.

While the literature on the design of individual on-site systems is copious,[2,3,15,18,19,21,22,23,31,47,120] there is limited published material on scaling up individual system design standards to handle clusters. Therefore, existing clusters using the different technologies are the best source of design data. A summary of existing cluster systems is shown in Appendix C.

3.1 Source Control

The average daily flow from a typical housing unit is approximately 45 gallons per capita per day (gpcd). Although water usage varies from household to household, the maximum flow rate is normally less than 75 gpcd.

Wastewater modifications at the source can be used to reduce wastewater flow and strength. Methods of wastewater modification include elimination of non-functional water use and utilization of water savings devices and wastewater recycle/reuse systems. Various

water conservation methods are described in the EPA process design manual.[44]

Elimination of non-functional water use can be accomplished by altering personal habits (such as toothbrushing with the water running), improving plumbing (such as fixing leaking faucets), and maintaining non-excessive water supply pressure. Water saving devices can include toilets, shower heads, faucets, washing machines and others.

Most recycle systems process only the wastewaters discharged from bathing, laundry and bathroom sink usage and restrict the use of recycle water to flushing toilets and lawn irrigation.[44]

Several methods are also used to reduce pollutant loading on cluster systems. These methods include improved user habits, elimination of garbage disposals, and segregation of toilet water containing human excretion (blackwater). Blackwater control strategies include compost toilets, low volume flush toilets, closed loop recycle toilets, and incinerator toilets.

Wastewater modification can have a significant effect on the design of cluster system components. Some potential benefits are increased service life, reduced frequency of septic tank pumping, reduced O&M costs, reduced size of infiltration area, and reduced component sizes. Wastewater modification should be considered during the planning phase for cluster treatment systems.

3.2 Pretreatment

The four pretreatment options found in cluster systems across the country are individual septic tanks, common septic tanks, individual aerobic tanks and common aerobic tanks. All pretreatment systems must have access ports to facilitate inspection and maintenance. When individual systems are used, it is critical to place the tanks so that the maintenance and inspection agency can have ready access. In Boise, Idaho, shared septic tanks are placed at the street rather than near the house.[162]

3.2.1 Septic Tanks

Septic tanks are buried anaerobic treatment units designed to separate solids from domestic wastewater, to provide limited digestion of organic matter, to store solids, and to discharge partially-clarified effluent for further treatment. The septic tank is the most widely used on-site wastewater treatment system used in the United States. Currently, 25 percent of the new homes being constructed in the United States utilize septic tanks prior to disposal of domestic wastewater.[44]

As can be seen in Appendix C, the majority of cluster systems for single family homes use septic tanks. There are several recent design manuals that describe septic systems.[16,25,28,30,38,44] The latter is the most extensive. The merits of baffled septic tanks at reducing

solids or grease carryover was recently reviewed.[132] Two-chambered septic tanks have a similar advantage and are recommended for cluster systems.[44]

In Illinois, septic tank design features and capacity requirements are regulated by the IDPH Private Sewage Disposal Act and Code. Minimum requirements are specified for tank material and strength, depth, inlet and outlet baffles, access provisions, and capacity. For tanks serving single family homes, the minimum required capacity is 750 gallons for a home with two bedrooms or less and an additional 250 gallons for each additional bedroom beyond two. If garbage grinders are used, approximately 50 percent additional capacity is required with a minimum of 750 gallons. Other requirements are specified for tanks serving multi-family dwellings, mobile home parks, schools, commercial, industrial, and recreational facilities. For flows between 1500 gallons per day (gpd) and 14,500 gpd, the required tank volume is 1125 gallons plus 75 percent of the daily sewage flow. If the design flow exceeds 1350 gpd, two or more tanks in series or a multi-compartment tank is required.

Flow estimation and septic tank sizing is particularly important with septic tank design because excess flows or sudden peaks can cause solids and grease to wash out of the tank and either clog the collection lines or become deposited in and clog the soil absorption system.[17,44] Too short a residence time also means that the BOD is not reduced. According to a study in Washington State, septic tanks for cluster systems were commonly undersized and resulted in frequent

Soil Absorption System (SAS) failures.[167] History with cluster systems, particularly mobile home parks, indicates this problem may occur frequently.[158,163,167,179,180]

When Septic Tank Effluent Pumps (STEP) are used, it is important to have a two-chambered septic tank with at least a one-day storage capacity in case the pumps fail.[115,126]

Common septic tanks are simply larger versions of individual tanks and are found frequently in mobile home parks or condominiums. Septic tanks have been identified serving from 2 (Ranch Village Mobile Home Park) to 225 (Brooke Hollow Estates in Ada County, Idaho) residences. Large septic tanks or Imhoff tanks are currently serving entire communities in Bluford, Cisne and Thompsonville in Illinois.

3.2.2 Aerobic Units

As an alternative to septic tanks, aerobic units may be used for pretreatment. Aerobic units are treatment units designed to separate settleable solids from domestic wastewater, to aerobically convert dissolved and colloidal organic matter to cell mass and carbon dioxide, to provide storage for settled sludge, and to discharge clarified effluent to another location for final treatment and/or disposal.

Aerobic units may be classified into two basic configurations - suspended-growth systems and fixed-film systems. Suspended-growth systems have been more widely used as on-site treatment units. These systems normally use the extended aeration variation of activated sludge whereby a high concentration of biomass is maintained in an aerated chamber of wastewater, followed by a solids separation step. Air is supplied by a mechanical device such as a blower which requires electrical power and generates some noise. Suspended-growth aerobic units may be designed for either continuous or batch operation. In the continuous mode, waste is treated and discharged as it is generated. In the batch mode, wastewater is collected and treated for a period of time (typcially one day) then settled and discharged at the end of the cycle.

Fixed-film systems also utilize bacterial decomposition of the organic wastewater solids, but in this case, the biomass is attached to an inert media such as stone or plastic. The wastewater can flow past the media (trickling filter) or the media can move through the wastewater (rotating biological contactor). Fixed-film systems have been widely used in full-scale municipal wastewater treatment, but are still in the developmental stage for use in on-site applications. Although they still require some mechanical components such as motors or pumps, they generally require less energy and maintenance than the suspended-growth aerobic treatment units.

The design of these aerboic systems is described in several documents and is available from manufacturers.[25,44] One advantage of aerobic

units over septic tanks is that they are capable of removing a greater portion of the BOD and aerating the effluent. For these reasons, some states require less absorptive area in the SAS and allow SAS's in clays that are not generally suited to septic tank effluent; however, there is currently some disagreement regarding justificaton for a decrease in the required disposal area.[170]

In Illinois, the IDPH regulations require all aerobic treatment units to meet the requirements of NSF Standard 40 and to be officially approved by the Department. Approved units are classified into two groups based on effluent quality. Those with Class II effluent (BOD $\leq$60 mg/l, S.S. $\leq$100 mg/l) are required to be followed with a full-sized SAS or a sand filter reduced in area by 50 percent. Following units with Class I effluent (BOD $\leq$20 mg/l, S.S. $\leq$40 mg/l), the SAS area may be reduced by 33 percent and sand filter area reduced by 50 percent. There is no relaxation on percolation requirements for soils used in SASs.

Although aerobic units work well when operating properly, they are subject to upsets and operating problems due to failure of electrical and mechanical components. Regular maintenance programs are required to ensure properly operating systems.[74,91,177,178] One manufacturer will not sell the systems unless there is an authorized maintenance person within two hours travel time.[177]

No examples of cluster systems were identified with individual aerobic units (although these are in relatively common use for individual

on-site disposal). However, Downington, Pennsylvania; LeRicheleiu Townhouses, Birmingham, Alabama; and Country Times Mobile Home Park, Porter, Texas, have common aerobic units ranging in capacity from 3 residences at LeRichelieu Townhouses to 17 residences at Country Times Mobile Home Park. Providing there are arrangements for routine and emergency maintenance, performance has been excellent.[177]

3.3 Collection

In addition to conventional sewage collection systems, there are two main types of alternative sewer systems used with cluster systems. Pressure sewers are used in conjunction with effluent pumps or grinder pumps, while Small Diameter Gravity Sewers (SDGS) rely on gravity flow from the septic tank to the common treatment system. Since the septic tanks remove the bulk of the suspended solids and grease from the wastewater, SDGS have greater design flexibility than conventional sewers. Vacuum sewers[109] have also been used on a very limited basis.

3.3.1 Pressure Sewers

Pressure sewers are used with either septic tank effluent pump (STEP) systems, aerobic unit effluent pumps, or grinder pump (GP) systems. Grinder pumps are used to grind and pump raw wastewater at each home or a cluster of homes. The ground wastewater is then transported to a multi-house pretreatment unit or directly to the point of final treatment and disposal. STEP systems utilize a pumping vault downstream of the septic tank to transfer septic tank effluent to the

location of final treatment and disposal. Aerobic units may also require effluent pumps and pressure sewers to transport the wastewater to the point of final disposal.

Pressure sewers are very small diameter (2"-4") pipes installed similarly to conventional water main installation (just below the frost line and following grade contours). No manholes or cleanouts are used, but air release valves are installed at high points in the line to prevent build up of gases. Check valves to prevent backflow are included in each STEP or grinder pump unit.

Pressure system design parameters are found in several references.[98,109,110,114,127,128,136,152] Such sewers are being found in increasing numbers. One of the largest systems has been in operation over five years at Glide, Oregon. The system includes a STEP system serving 1,740 persons and a GP system serving 40 persons. Two of the oldest systems are in Port Lucie and Port Charlotte, Florida. The most common problems to date have been pump failure, corrosion, and odors.[115,126] Designers have since realized that clean water equipment and materials cannot be used with septic tank effluent, and have successfully identified suitable substitutes. Odor problems have been managed by improving the seal on the tanks and, in some instances, blowing air into the sewer lines.[126]

Other problems have occurred in northern climates. In Cuyler, New York, the lines were not placed deep enough into the ground, and they subsequently froze.[160]

Another design issue involves pump design and valving. Rags, rocks, sticks, diapers, etc., may find their way into the pumps, and can clog and destroy them. For this reason, centrifugal pumps and compressors are preferable to progressive cavity or positive displacement pumps for STEP systems.[39] It is also important to provide valving which will maintain pressure in the line, prevent air bubbles, and allow the sewer authority to shut off particular sections for repair.[4]

3.3.2 Small Diameter Gravity Sewers (SDGS)

SDGS are 3"-6" sewers usually made of PVC pipe.[116] These sewers are relatively easy to place in the ground and less expensive than conventional sewers. In addition, because the bulk of the solids have been removed from the sewage, researchers are investigating the feasibility of variable grade SDGS without the danger of obstruction.[170] A variable grade SDGS has been operating successfully in Mt. Andrew, Alabama, since 1975.[37] Others have been installed in Westboro, Wisconsin, Badger, South Dakota, and at various sites in Shoshone County, Idaho.[166] SDGS cluster systems in Illinois include Waynesville[124] and LaMoille (in design).[144]

One major issue with these systems is determining appropriate design requirements for flow, slope and velocity. Widely accepted design values have not yet been firmly established;[170] however, some recommendations have been developed.[17,143,164] Since these sewers are subject to less infiltration/inflow and since flow peaks are dampened within the pretreatment units, reduced design flows are appropriate.

Suggested design flows range from 0.1 to 0.4 gpm per house connection.[143] Also, since the heavier wastewater solids have been removed in the pretreatment units, conventional scouring velocities are not required. The U.S. EPA Region 3 office recommends a minimum velocity of 1.0 ft/sec when flowing full. Current Illinois EPA policy limits sewer size to a minimum of 4" diameter and requires a minimum velocity of 1.5 feet per second.[164]

Experience with SDGS systems has been good.[37,170] Some designers feel that manholes are not desirable because they introduce an opportunity for dirt, debris and extraneous flows to enter the sewers. If manholes are not used, cleanouts should be installed at all bends, junctions and regular intervals along straight sections. The Illinois EPA currently requires manholes at all junctions and bends and cleanouts at 400 to 600 ft. intervals.[164]

3.4 Treatment

The major categories of treatment facilities consist of Soil Absorption Systems (SAS), sand filters and lagoons. Existing package treatment plants, land treatment and aquaculture systems used in conjunction with individual on-site pretreatment or common septic tanks were not found in the literature.

3.4.1 Soil Absorption Systems (SAS)

Subsurface application of effluent is the technology most commonly found in planned and retrofit cluster systems. Partially treated wastewater is discharged below the ground surface where it is absorbed and treated by the soil as it percolates to the groundwater. Travel through 2 to 4 feet of unsaturated soil is necessary to provide adequate removal of pathogenic organisms and other pollutants from the wastewater before it reaches the groundwater.

Subsurface Soil Absorption Systems can be subdivided into five major types:

1) Trenches (Rochester, Vermont),
2) Large Beds (Hyde Park, Vermont, Westboro, Wisconsin, and Avery, Idaho),
3) Deep Seepage Pits (Maple Hills Subdivision, Ada County, Idaho, and Montecido Verde, Nipomo County, California),
4) Mounds (Ranier, Minnesota, and La Crosse, Wisconsin), and
5) Evapotranspiration Beds (Badger, South Dakota)

Several references discuss design criteria for these SAS systems.[16,20,25,33,34,38,41,43,44,45,113,142,140]

Trench and bed systems (Figures 3-1 and 3-2) are most commonly used for cluster wastewater treatment and disposal. These are shallow perforated pipe distribution systems laid in crushed rock and

backfilled to grade. Both the bottoms and sidewalls of the trenches are infiltrative surfaces. A typical bed will include several distribution pipes, while trench systems include one pipe per trench.

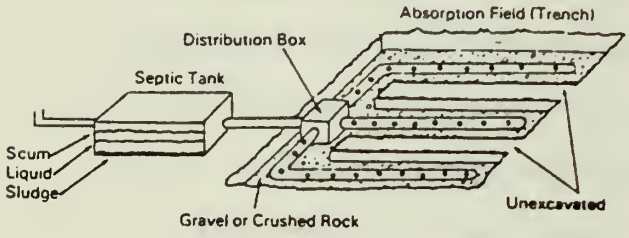


Figure 3-1

Typical Trench System[42]

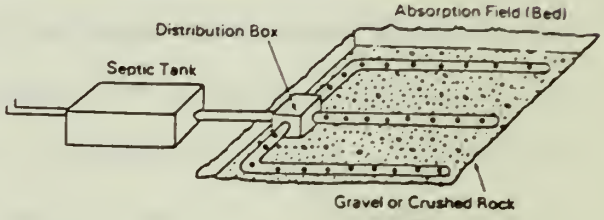


Figure 3-2

Typical Bed System[42]

The IDPH regulations require subsurface disposal to be by trench or bed systems in most instances. The required seepage area is determined by soil percolation rate and quantity of wastewater (based on number of bedrooms or design flow rate). Other requirements on design features place limitations on distribution boxes, trench width, depth and slope, distribution lines, bedding, and backfill configurations, and locations. Subsurface systems are not allowed in Illinois if the water table is within four feet below the bed or if the percolation rate is too low or too high.

Seepage pits (Figure 3-3) are deep excavations in which porous walled chambers allow pretreated wastewater to seep through a crushed rock layer and into the natural soil. Seepage pits are not allowed in Illinois except where the top four feet of soil are too impermeable for seepage fields or beds and there is sufficient depth of permeable

soil beneath the top four feet. Seepage pits are not allowed within 100 feet of water wells or if the seasonal high water table or limestone strata is within 14 feet of the ground surface.

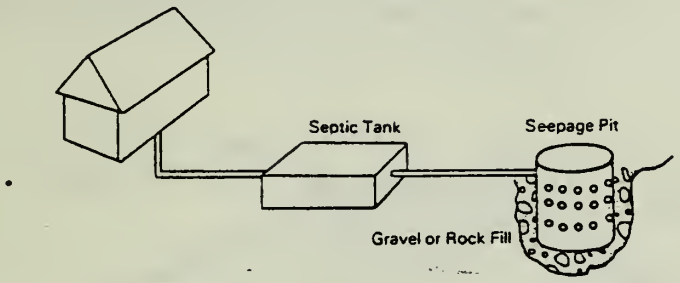


Figure 3-3 Typical Seepage Pit[42]

A mound system (Figure 3-4) is a soil absorption system that is elevated above the natural soil surface in a suitable fill material.[44] Mound systems are used in situations where soil conditions (such as slowly permeable soils and permeable soils with a high ground water table) prohibit the use of trench or bed systems. Mound systems are generally effective; however, problems have occurred with breakouts on the sides due to erosion or overloading.[159,160] Mound system design is discussed in several references.[14,24,44,103,106,108,123,148,153]

IDPH has recently published design requirements for mounds used in Illinois.[154] Although mound systems are not normally necessary in Illinois, this method has been used for at least one Illinois cluster project. In Waynesville[124] mounds were selected for the following reasons:

1. Soil compaction during construction is minimized by use of a sandfill above the natural grade.

2. The fill allows placement of the absorption bed on a sloping site.

3. The fill provides a uniform, permeable media that can be loaded at a higher rate than fine textured soils (although the mound base area must be sufficient to allow percolation of the entire flow with no seepage out the side of the mound).

4. Corrective action may be easier and less expensive if problems do develop.

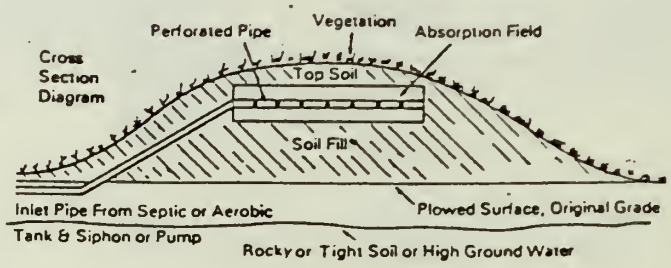


Figure 3-4 Typical Mound System[42]

Evapotranspiration (Figure 3-5) is limited to warm, dry areas and small quantities of wastewater and would not be appropriate for use in Illinois. Evapotranspiration beds can be used to dispose of wastewater to the atmosphere so that no discharge to surface or ground water is required.[44] The bed consists of a sand bed with an impermeable liner and wastewater distribution piping. Several references discuss design information on evapotranspiration beds.[44,98,95,122,134,146]

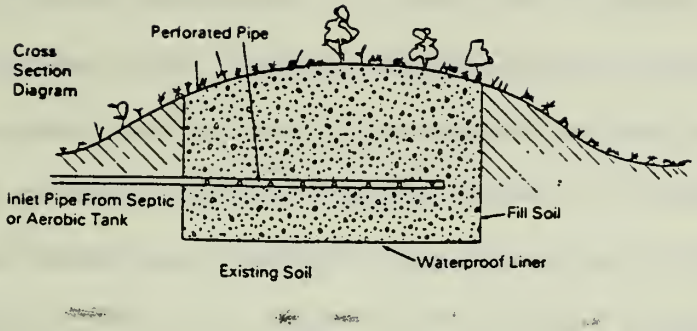


Figure 3-5 Typical Evapotranspiration Bed

SAS Problems and Solutions

History with soil absorption systems indicates that the two most frequently encountered problems involve sizing and site evaluation. Historically, these systems, particularly beds, have failed because of undersizing. Experience has indicated that the sidewall area is an important part of the absorptive surface, and larger systems should be scaled up on the basis of sidewall and bottom area, not just bottom area.[113,156,167,170] Another concern is to make the system large enough to handle expected growth in the number of residents it serves. This problem has been encountered frequently in mobile home parks where the owner installs more trailer pads than the system was designed to handle.[158,176,179] Similarly, some community systems have commercial or restaurant users. These users can place strain on the SAS and should be required to install more extensive pretreatment, such as a grease trap in some instances. A grease trap failed in Quail Lodge in Monterey County, California, and caused the SAS to fail.[161]

Large SASs have a much greater impact on groundwater flows. They result in considerably more and higher mounding which can slow absorption from the bottom and sidewalls, and may also result in inadequate treatment[1175] Because of their greater hydraulic impact, it is important to obtain a much more detailed geohydrological profile before installing such a system. The Rochester, Vermont, system failed largely because of inadequate understanding of the deep geohydrology.[171] This also occurred in California when unexpected clay lenses disrupted the effectiveness of the systems.[179]

In Illinois, IDPH reglations base SAS area requirements on the results of soil percolation tests. At least two test holes 4" to 6" diameter and 24" to 36" deep are required. The percolation rate is the time required for the last six inches of water to seep out of the hole after the hole has been saturated and kept full for at least four hours immediately preceding the test. This test provides a reasonable basis for individual systems, but for larger cluster systems a simple percolation test does not provide enough information on the absorptive capacity of the soil, and a number of factors can cause the test to give misleading results.[141] Hydraulic conductivity tests should be conducted, and the soils analysis should extend below the seepage field depth. Furthermore, groundwater flow patterns must be categorized more extensively. A new device is available which provides information on both groundwater flow direction and rate.[168] One article describes the information required for site analyses.[89]

SASs, regardless of design, have limited life spans--eventually a

clogging mat develops and retards infiltration.[90] Various methods prolong system life. These include periodic dosing rather than continuous distribution (Shiloh Village in Billings, Montana), uniform low pressure distribution[105,139] (Madison Project in Pine Hill Burrough, New Jersey), and diversion valves to allow the SAS to rest for a given part of the year (Cuyler, New York, and Maplewood Sanitary District in Door County, Wisconsin). The U.S. EPA Design Manual[44] discusses the procedures for designing these systems. Another way to prevent drainfield clogging is now being tested in Illinois. This technique utilizes a bubbler hose placed within the drainfield along with an aeration or ozonation system. On test systems in Lake and Cook Counties, aeration has restored percolation of clogged beds within days.[167]

Because of the threat of ultimate failure, state and local agencies often require that space for a replacement SAS be available. SASs should be designed with observation ports to facilitate evaluation of the clogging mat. It may be advisable to meter the flows in order to evaluate when beds should be switched.[77,161]

3.4.2 Sand Filters

In areas where soil absorption systems are unacceptable due to low permeability soils or high ground water tables, sand filters are

commonly used to provide additional treatment following pretreatment in septic tanks or aerobic units. This situation exists over much of Illinois.

Sand filters are beds of granular material 2 to 3 feet deep with a pipe distribution system on the upper surface and pipe collection system within a gravel bed below the sand. In addition to removal of solids by straining, the filters have an active biological growth which removes organics and converts ammonia to nitrate. Filters may be either open or buried and intermittent or recirculating. Buried filters are vented to the atmosphere and are commonly used for on-site systems to improve appearances and reduce odors. Since buried filters require excavation in order to perform any maintenance, they are not as appropriate as open filters for large cluster systems.

Intermittent filters are dosed intermittently either by the natural variations in the wastewater discharge from pretreatment units or by special dosing systems using siphons or pumps and designed to flood the entire filter at least twice a day. Recirculation is used only with open (or free access) filters and requires a recirculation tank between the filter and pretreatment unit. Pretreated wastewater and filter effluent both flow into the recirculation tank. At regular intervals, the mixture is pumped onto the filters. This allows greater volumes of better quality wastewater to be applied to the filter at regular intervals and, in some cases, improves final effluent quality. More detailed filter design information is presented in the U.S. EPA Design Manual[44] and elsehwere.[129,130,131]

In Illinois, the IDPH regulations allow either buried filters or recirculating open filters following pretreatment in septic tanks or aerobic units for systems serving up to 1,500 gallons per day. In either case, a surface discharge of effluent is required. For systems larger than 1,500 gallons per day, the Illinois EPA does not allow use of buried filters. This is due to the inaccessibility for fitler maintenance noted by Lombardo[19] and several others. However, if properly designed, buried filters can operate successfully for extended periods without maintenance.

3.4.3 Other Treatment and Disposal Systems

Although much less common than soil absorption systems and sand filters; lagoons, land application, and aquaculture are also utilized for final disposal of pretreated cluster system wastewater.

Lagoons have been used in Mt. Andrew, Alabama, and Bottle Bay, Idaho. Several references describe lagoon system designs.[36,41,42,118,135,137,138,145,147]

One problem associated with lagoon systems is that they often do not provide effluent that meets NPDES or state standards. In this case, lagoons may be followed by sand filtration. For LaMoille, Illinois, this combination was found to be more cost-effective than direct

filtration of septic tank effluent.[144] Odor problems at lagoons following septic tank pretreatment may be reduced by use of multiple inlet points around the lagoon periphery.[168]

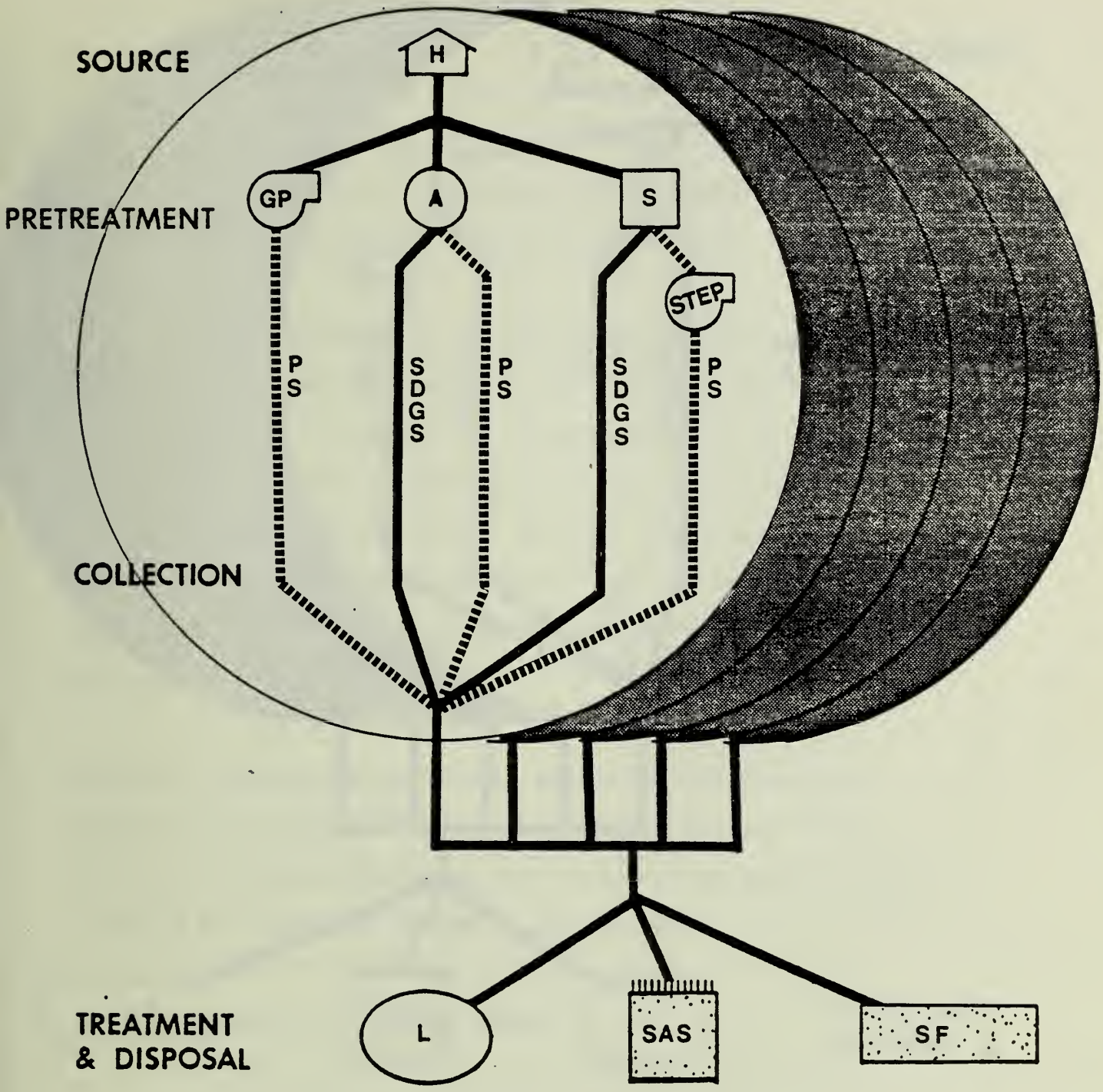
Land application can also be used in conjunction with lagoons that do not meet NPDES standards. In Grantfork, Illinois, Fillmore, Illinois, and Shallothe, North Carolina, land application is used following septic tank pretreatment and lagoon secondary treatment. Land application design practice is discussed in many sources.[40,46,48,49,50,51,52,92,93,96,104,119,121,150]

Aquaculture technology has been used in Newcastle, Viginia, and Woodstock, New York, and also has been discussed in several references.[102,107,112,125]

3.5 Total Systems and Applications

3.5.1 Combinations of Cluster Components

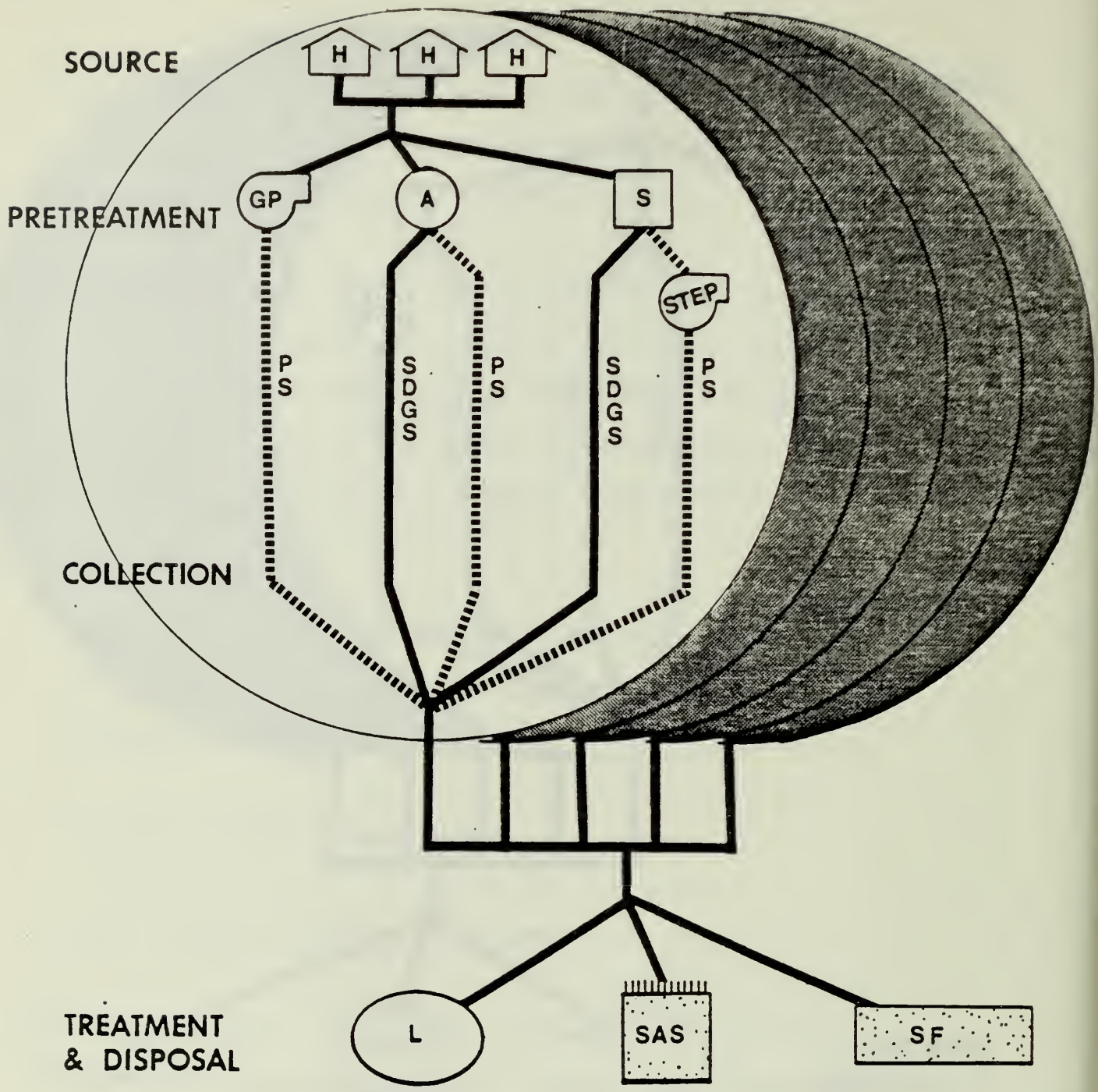
Figures 3-6 and 3-7 are graphical representations of potential combinations of cluster components. Figure 3-6 outlines different combinations of pretreatment, collection, and treatment alternatives, where individual pretreatment units are followed by group final treatment units. These systems are commonly used for retrofit clusters where existing pretreatment units are incorporated into the cluster system. Figure 3-7 outlines cluster systems that utilize



LEGEND

H - HOUSE
S - SEPTIC TANK
A - AEROBIC UNIT
GP - GRINDER PUMP
STEP - SEPTIC TANK EFFLUENT PUMP
SDGS - SMALL DIAMETER GRAVITY SEWER
PS - PRESSURE SEWER
SAS - SOIL ABSORPTION SYSTEM
SF - SAND FILTER
L - LAGOON

Figure 3-6 Cluster Systems Utilizing Individual Pretreatment Units



LEGEND

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GP - GRINDER PUMP
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SDGS - SMALL DIAMETER GRAVITY SEWER
PS - PRESSURE SEWER
SAS - SOIL ABSORPTION SYSTEM
SF - SAND FILTER
L - LAGOON

Figure 3-7 Cluster Systems Utilizing Group Pretreatment Units

group pretreatment systems. Often a cluster system is composed of group pretreatment units which are routed to one or more final treatment systems. Cluster systems can also be composed of a combination of individual and group pretreatment units.

Several factors influence the decision of which cluster components are used and how they are combined into a total system. Some of these factors include: 1) population, 2) acreage served, 3) existing problems, 4) soil type, 5) topography, 6) groundwater table, and 7) construction and operating costs. Technical factors such as soil type, topography, and groundwater table may be used to eliminate some alternatives, and the remaining alternatives can be compared based on cost and reliability.

Appendix C identifies actual cluster systems and indicates which combinations of components have been utilized in existing systems. Most cluster systems installed to date involve a combination of septic tanks and soil absorption systems of various types.

3.5.2 Applications for Cluster Systems

There are numerous potential applications for cluster systems in Illinois. Cluster systems can be built to correct existing problems (retrofit clusters) or to serve new developments (planned clusters). Usually, the cluster system is built either because soil characteristics are unsuitable at individual home sites, lot size is too small to allow individual SASs, or because costs for individual

septic and SAS systems are too high. Cluster systems are also gaining favor in situations where conventional collection and treatment systems would have been used previously. Instead of building conventional sewers, pressure and small diameter gravity sewers are being used to transport effluent from septic tanks to a soil absorption system or a conventional secondary treatment system. In addition to serving new developments, these systems have been used to upgrade areas where public health problems exist due to inappropriate siting of Septic Tank - SAS systems.

Potential applications of wastewater clusters in Illinois are listed below. The potential applications are not necessarily mutually exclusive; that is, a particular situation may be viewed as a potential cluster application for more than one reason. Also, one project may include both retrofit and planned clusters. Separate lists of retrofit and planned cluster applications are presented to emphasize the differing planning, economic and management considerations in each case.

Application	Comments
RETROFIT CLUSTERS:	
(1) Rural unsewered communities	Generally involves EPA grant or FmHA funding; may be mixture or onsite and cluster systems; municipal disposal zone most likely management entity.
(2) Urban fringe areas, incorporated	Similar to (1); secondary impacts of interceptor extensions important in comparing sewer vs. cluster alternatives.

(3)	Low-density urban areas	Where sewer length per connection is very high, clusters (or alternative collection systems such as pressure sewers) may be cost-effective even if interceptors are available.
(4)	Urban areas with topographic or geological constraints	Steep slopes, natural or manmade obtacles such as streams or major highways, or geological conditions may make clusters more cost-effective than sewer extensions.
(5)	Rural lake areas, unicorporated	Extensively studied by EPA Region 5; properly designed clusters may protect water supplies and avoid eutrophication; management entity requires special consideration since, under present Illinois law, only muncipalities may establish disposal zones.
(6)	Other unincorporated areas	Similar to (5); performance standards for clusters may be somewhat less stringent than (5) since pathogen and nutrient removal may be less critical for discharge to streams rather than lakes.

PLANNED CLUSTERS:

(1)	Rural Unsewered communities	Communities establishing disposal zones for onsite/cluster approaches under the grants program will need to provide for future development; most likely applications will be small cluster subdivisions with municipal management.
(2)	Urban fringe areas, incorporated	Developers of land beyond existing sewers may be given the option of installing clusters or paying entire cost of interceptor extension; management entity may be homeowners association, private utility or municipality; design should consider possibility of abandoning cluster disposal and connecting to sewers when contiguous development reaches site.

(3)	Urban fringe areas, unincorporated but within 1.5 miles of incorporated municipality	Illinois law gives municipalities zoning powers up to 1.5 miles beyond the corporate limits; may want to encourage or require clusters to reduce likelihood of residents demanding sewers upon annexation once corporate limits reach the development; management entity may be homeowners association or private utility.
(4)	Large lot developments in urban areas	Large lots may make sewers expensive, but onsite systems may create buyer resistance in expensive developments; in this situation, the developer may request city permission to install clusters rather than sewers.
(5)	Urban areas with topographic or geological constraints	As in (4), developer may initiate request for cluster approval in these situations; city may approach request from fiscal impact perspective and negotiate on both design standards and management arrangements.
(6)	Urban areas with overloaded wastewater facilities	Communities with collection or treatment facilities at or exceeding capacity may be unable to obtain IEPA permits for sewer extensions to serve new developments; municipalities may encourage or require developer-built clusters as an alternative to relief sewers or treatment plant expansions.
(7)	Rural lake areas, unincorporated	Clusters permit small lakefront lots, if desired, with disposal in multiple-use open space; management by homeowners association or private utility possible; pressure sewers to land treatment or subsurface disposal away from lake may be appropriate alternatives.
(8)	Other unincorporated areas	Similar to (7); performance standards may be less stringent for discharge to stream;

(9)	Large-scale planned unit developments	Similar to other potential applications except that larger development size may make planned wastewater reuse (e.g. golfcourse watering, agricultural irrigation) feasible; Planned Unit Developments (PUDs) are typically designed with open space which may be suitable for subsurface disposal; PUDs often have owners associations to own and manage open space and recreational facilities; they may also manage wastewater clusters; constructing clusters in phases as development proceeds may be advantageous to developer in comparison with large initial cost to extend interceptors to site.

A typical example of a cluster system application in Illinois is the Village of Waynesville.[124] Waynesville fits in the first category of retrofit cluster applications - rural unsewered communities. A household survey conducted in this village of 560 persons showed that approximately 45 percent had individual ST-SASs which were in general conformance with IDPH requirements, 25 percent had septic systems for toilet wastes with direct discharge of "gray water," 27 percent had direct discharge of septic tank effluent, and the other 3 percent had cesspools. A cost-effectivenss analysis conducted in accordance with U.S. EPA Construction Grants requirements showed that the most cost-effective alternative was to utilize on-site ST-SASs where lots were suitable and to provide clusters elsewhere. The final design included a cluster ST-SDGS-SAS (mound) system serving 51 buildings on the east side a cluster ST-SDGS-SAS (seepage field) system serving 4 homes on the south end, and upgrading the remaining individual on-site systems as required.

The estimated monthly cost per residence was $7.40 for the cluster system plan, less than half the cost of a centralized system using conventional gravity sewers and lagoon treatment. The project was funded by an 85 percent U.S. EPA construction grant and a Farmers Home Administration (FmHA) loan for the local share. The project is now nearing the completion of construction.

4.0 MANAGEMENT OF CLUSTER SYSTEMS

There are three key aspects of effective management of wastewater cluster systems. First, regulatory authority must be clearly established for developing design standards, reviewing plans, authorizing construction and operation, verifying that local ordinances are acceptable, and enforcing the treatment system performance requirements. Second, there must be a mechanism established for financing the construction, operation, and maintenance of the treatment system. Finally, there must be a designated management agency responsible for directing the planning, design, installation, and on-going operation and maintenance of the system.

4.1 Regulatory Agency

As discussed in Section 2.0, the regulatory authority for cluster systems in Illinois may rest potentially with several different state and local agencies including IEPA, IDPH, local health departments, and other local units listed in Appendix B. If more than one agency is involved, there should be a clear delineation of responsibilities.

Currently, the IEPA is responsible for regulating systems with flows over 1,500 gallons per day which have a surface discharge and for approving all retrofit clusters funded under the U.S. EPA Construction Grant Program. For smaller systems or those with subsurface discharge, IDPH is the responsible regulatory agency. The IDPH also

has the authority to designate local health authorities to act on their behalf. These designated local units are indicated by an asterisk in Appendix B. When local units are not so designated, requirements of both the local unit and IDPH must be satisfied.

The role of the regulatory agency begins early in the planning process. In Illinois, a developer or municipality planning a cluster system is required to submit plans and specifications to IEPA or IDPH (whichever applies) for their review and approval prior to issuing a permit for construction and operation. Seeking regulatory input during the development of plans will increase the likelihood of an approvable system and avoid the cost of major revisions and re-submittals. This early and frequent contact with regulatory agency works well where there is adequate staff to provide quick, informal responses. If not, problems will develop. For example, in Missouri the state agency is so understaffed that many developers are reluctant to follow the regulations. In the absence of a strong regulatory presence, many poorly designed and maintained systems exist, and some are failing.[165]

Another role of the regulatory agency is to verify that the required legal liabilities and mechanisms are in place prior to approving a cluster system. In retrofit cluster systems, ordinances are usually used to establish the legal mechanisms. For planned systems, homeowners' agreements are often used to assign legal responsibility.

In Downington, Pennsylvania, all of the following separate agreements exist:

- homeowner-developer
- homeowner-town
- homeowners association-town
- homeowners association-developer
- developer-town
- town-county

In this way, should any party default on his or her responsibility, there is redress.

The major legal considerations which must be established include:[66,68,71,80.82]

1. **The respective financial and legal responsibilities of the homeowner, management agency, regulatory agency and developer throughout system life for design, installation, operation, maintenance, monitoring and replacement.**

   A particular concern for planned systems is the transition between developer and homeowner responsibility. In Brainerd, Minnesota, the failing system was replaced at county expense because something had to be done, and the developer refused to fix the system. The county is now suing to recover their costs. In Downington, Pennsylvania, and Boise, Idaho, the

developer is legally obliged to be responsible for the system should it fail.

2. Legal enforcement mechanisms and procedures for insuring that assigned responsibilities are carried out and fees collected.

   The proper mechanism depends on the function. For example, in Boise, Idaho, the county health department can insure adequate O&M by administrative orders to the homeowners' association to hire better maintenance personnel. Alternatively, court orders or fines (Marin County, California), the legal right to perform the work and bill the homeowner (Boise, Idaho), property liens for unpaid bills (Boise County, Idaho), or renewable occupancy permits that must be valid particularly upon sale of a residence (Rothsday Camp, Minnesota, and Marin County, California) can be used to make sure that the developer or homeowner builds and maintains the on-site portion of the cluster system properly. While one time occupancy permits (Fairfax County, Virginia) or building permits (Boise, Idaho, Georgetown Divide Public Utility District, El Dorado County, California) can insure that the system is designed and installed properly.

3. The legal means to assure access to the parts of the system on private property.

This may be accomplished through deed restrictions (Port Lucie, Florida, Port Charlotte, Florida, Rothsday Camp, Minnesota), easements (Cuyler, New York), local ordinances (Lake Mead, Pennsylvania), or service agreements (Port Charlotte and Port Lucie, Florida).

4. Easements and rights-of-way for common collection sewers or treatment systems across private property (Cuyler, New York).

This process may be more difficult than expected, particularly in rural areas or vacation areas with absentee landlords. In Iselin Township, Pennsylvania, the cluster system plan had to be abandoned because of legal fees involved with tracking down landlords and gaining easements so that adjacent houses could share a common leach field. Frequently, neighboring houses were separated by an empty lot owned by a third party.[5]

4.2 Financial Management

The second major component for successful cluster system management is providing adequate financial support for the systems and procedures for collecting the funds. Some of the financial responsibilities are established by the legal mechanisms discussed above. Different financing approaches may be used for construction than for operation

of a cluster system. In general, the construction cost of planned or retrofit clusters may be financed in any acceptable, legally-authorized way. Optional approaches include the following:

-- bonds (Cuyler, New York)

-- general taxes (Fairfax County, Virginia)

-- one-time assessments (a fee whenever a house is sold in Port Charlotte and Port Lucie, Florida; an initial connection fee in Georgetown Divide Public Utility District)

-- homeowner or developer financial responsibility (initial installation in Boise County, Idaho)

Financing the operation, maintenance and replacement of a cluster system may also be done in a variety of ways. If the system is a retrofit cluster funded under the U.S. EPA Construction Grants Program, then the grantee must demonstrate that an equitable user charge system is in place which distributes fees in proprotion to the service actually received. This may be done using an ad valorem tax or, more commonly, using a user fee based on water consumption. Financing options for operations, maintenance, and replacement of cluster systems include:

-- user fees (Georgetown Divide Public Utility District in Eldorado County, California, Port Charlotte and Port Lucie, Florida

-- homeowner or developer financial responsibility (initial installation in Boise County, Idaho)

4.3 Management Agency

Establishing a management agency responsible for overseeing design, construction, operation and maintenance is probably the most critical component for insuring successful performance of a wastewater cluster system. One of the major fears of regulatory agencies is that cluster systems require operation and maintenance and money to operate properly, yet there will be no one person responsible for operation and finances.[156] This results in two serious problems. There is no one to see that routine maintenance gets done and no one to make sure that major failures or problems are corrected. Past experience has shown this to be the case. For example, an apparently well-designed system in Cuyler, New York, that used grinder pumps, a group septic tank and a dual bed soil absorption system (SAS) with a diversion valve to allow for resting had no designated authority responsible for operation and maintenance. As a result, the diversion valve was not switched in three years.[160] There are numerous reported instances where systems failed because they were not designed or installed with adequate supervision. These include the Damsite Subdivision in Missouri,[165] North Long Lake in Brainerd, Minnesota,[157] and various mobile home parks in California.[179,180] Similarly, in Boise, Idaho, one developer hired a poorly qualified operater who failed to do his job properly. The area health district was forced to hold an administrative hearing and order the developer to hire a better person. There have been no problems with the system since.[162]

It is essential to identify a competent management entity responsible for overseeing the design, installation, and on-going operation and maintenance of these systems early in the planning period. Management agencies can be new or existing:

-- Homeowners' associations as found in Downington, Pennsylvania, Birmingham, Alabama, and Boise, Idaho;

-- Sanitary districts or public utility districts as found in Madison Project, New Jersey;

-- Government agencies such as a city or county public works or sanitation agency as found in San Luis, Obispo County, Califonia, and Shiloh Village in Billings, Montana.

In some instances, the responsibility may be divided among a number of organizations. Several references discuss the different possibilities.[66,68,71,80,82]

Once the planning has been completed, the need for cluster system management continues with the following activities:

- Overseeing design and construction
- Operation and maintenance
- Inspections
- Monitoring
- Collecting User Fees
- Enforcement
- Record keeping

In many instances, different agencies or organizations will have responsibilities for these different aspects of cluster system

management. Three documents in particular discuss the management of on-site systems and cluster systems in detail and include several case studies.[66,80,83] Englehart and Ward describe a computerized model for estimating management efforts for cluster systems.[69] There are several additional informative articles on cluster system management.[26,27,28,60,61,62,63,64,65,67,72,73,74,75,78,79,81,84 85,86,87]

An important distinction that must be made in the management of on-site systems is the difference between who performs the work and who is responsible for seeing that the work gets done.[80] In many instances, the mangement agency will contract with the private sector to complete the work; or, the homeowner may have the option to use either the management agency's services or contract for their own expert. For example, the Georgetown Divide Public Utility District will design a treatment system for a house or group of houses, or allow the homeowners to hire their own engineer. Finally, the homeowners may be responsible for some activities entirely on their own, as in Fairfax County, Virginia, where the homeowner is responsible for obtaining inspections.[83]

Maintenance is the most pressing role of a cluster system manager. This includes routine maintenance for pump servicing, septic tank inspections and pumping, aerobic tank cleaning, SAS inspections, SAS valve diversions, and emergency maintenance for faulty pumps, tanks, and line replacement.

Experience with existing systems has revealed several important aspects of on-site system management. Whenever a pump is used in any part of the cluster system that is on the homeowner's property, warning lights that indicate pump failure should be installed in a location that the homewoner is likely to see. These must also be tamper proof.[70] When pump failures occur, spare parts and pumps must be on hand to insure that replacement is easy.[70,115,126] Staff must be experienced and an operation and maintenance manual should be available in order to ensure that the correct maintenance occurs.[162] A record should be kept on each system to ensure that the maintenance gets done on schedule,[83] that a history of maintenance is available for enforcement purposes,[162] and that a new maintenance person can take over.[70]

5.0 ISSUES ASSOCIATED WITH CLUSTER SYSTEMS

Many of the key technical and management issues have been brought out in the previous discussions. In this section, the major unresolved issues are summarized under five categories: 1) engineering, 2) environment/public health, 3) economic, 4) legal/management, and 5) land-use considerations. In order to evaluate these issues from different perspectives, a panel of experts from different backgrounds was formed. Panel members are listed in Appendix D. Each panel member was sent a draft copy of Chapters 1 through 4 of this cluster system report and was asked to comment on the issues discussed below. Opinions of the panel members were then used to help formulate recommendations for resolving the issues.

5.1 Engineering

5.1.1 Design Flows

IDPH standards base design of on-site residential systems on number of bedrooms. IEPA uses actual measured flows, if available, or per capita estimates. The IDPH method will generally result in much higher design flows than the IEPA method. A uniform method of determining design flow for multi-building clusters is needed. Also, consideration of safety factors should be explicit rather than concealed in design rules of thumb.

Since IDPH criteria are based on safe-guarding against poorly maintained systems, they are probably overly conservative for regularly maintained cluster systems. Where retrofit clusters are proposed, there may be actual water use records which could be used to develop a design flow, including an allowance for infiltration and future growth. Experience with small communities in Illinois indicates that actual water consumption is typically about 40 gallons per person per day in residential areas. For planned clusters and retrofits where no water flows are available, wastewater design flows should be based on population projection and per capita flows, including an allowance for future growth.

5.1.2 Site Evaluation and Performance Monitoring

When the soil is an integral part of the treatment process for large clusters, more detailed site evaluation may be needed than for individual on-site systems. In addition to percolation tests, a brief geologial evaluation should be performed including at least one shallow boring and a characterization of the shallow groundwater in the area.

If the site evaluation is favorable for SAS, then groundwater monitoring (level and quality) should be performed at regular intervals, including at least two background samples collected prior to construction.

The frequency of monitoring and the site evaluation criteria should depend on the size of the system and distance to nearest water supply well. As the risk of water pollution increases, the monitoring effort should also increase.

5.1.3 Special Design Features for Scaling-up On-Site Systems

Clusters may use seepage fields or other systems most often used with single family systems. The new IDPH rules permit clusters, but do not impose any additional design requirements.

If additional requirements are too conservative, then cluster systems will no longer be cost-effective compared with individual on-site treatment and disposal. As a minimum, duplicate units for filtration or seepage fields should be required with provisions for controlled dosing of either unit. Some reserve absorption area should also be required on SASs. Other features, such as two-compartment septic tanks, which could improve the system reliability with little added cost, should also be considered.

5.1.4 Risk Assessment, Innovative Designs, and Experimental Permits

In general, cluster technologies involve heavy reliance on land-based treatment processes with relatively little operator control. This does not imply that cluster systems result in greater risk than conventional systems. Actually, cluster systems which are properly designed should pose an intermediate level of risk - greater than

individual systems because of the larger wastewater quantities of one location, but less than conventional systems because of reduced reliance on mechanical components which are more prone to failure. The key to minimizing risk is to design with adequate operational flexibility rather than more conservative design features.

The U.S. EPA grants program contains explicit recognition of risk/benefit considerations for innovative technologies, and both IEPA and IDPH have provisions for experimental permits. Under the federal criteria, cluster systems are generally considered as alternative technology, but certain components of clusters, such as variable grade small diameter sewers, are considered innovative technology. In either case, if the project were funded from the federal Wastewater Construction Grants program, it would be eligile for 100 percent replacement cost funding to correct deficiencies if failure occurred within the first two years. In order to minimize the chances of failure, the state agencies (IEPA or IDPH) should use professional judgement in reviewing the design to verify that the basis of design is reasonable; however, they cannot guarantee success. The public should be willing to accept some risk in order to advance the limitations on cluster system technology.

If a cluster project is constructed with private funds, the developer would be required to post a performance bond for up to five years in order to receive a permit for construction. This would provide an incentive for the job to be done right and a source of revenue for correction should problems arise.

5.2 Environment/Public Health

These issues are discussed at length in relation to on-site systems in IINR Document No. 80/19, On-Site Waste Water Treatment and Disposal Systems (Environmental and Health Effects).[35] Cluster systems will have similar effects except for differences due to the larger scale of clusters compared with individual on-site systems. Issues related to secondary environmental impacts such as induced growth are discussed under Land Use.

5.2.1 Surface Discharges from Clusters

Surface discharges under IEPA regulations generally must meet at least a 10/12 standard (BOD_5 and suspended solids in mg/l) for discharge to low flow streams or 30/30 where stream dilution of five times or greater is available.

Under circumstances described in IPCB regulations, a 30/37 standard may be permitted for lagoons. IDPH requirements for surface discharge are currently 20/40, but a proposed rule change will modify that requirement to 30/30.

Representatives of IEPA and IDPH have indicated that their standards are both appropriate for clusters, depending on which is applicable for a particular system. That is, systems over 1,500 gpd with surface discharges must meet IEPA requirements, while smaller systems are governed by IDPH standards. There is some logic to this approach

since larger systems have greater potential for environmental consequences. Nevertheless, there should not be an incentive to construct two different 1,500 gpd systems when a single 3,000 gpd system could do just as well at lower cost. For this reason, it would seem more logical for a single standard to apply to all cluster systems employing a particular technology. If necessary, a reasonable upper flow limit such as 150,000 gpd could be established, above which conventional IEPA standards would apply.

A cluster system employing third-stage lagoon(s) for final treatment should qualify for lagoon exemptions described above under the same circumstances as a conventional system. There is no authority for IEPA to extend this exemption to other treatment process configurations.

To confirm that plant performance is meeting applicable effluent standards, some routine monitoring is required. Effluent monitoring requirements should vary depending on the size of the system, with quarterly monitoring for large systems and semi-annual monitoring (once in summer and once in winter) for smaller systems.

5.2.2 Clusters with Land Treatment

Land application of wastewater effluents includes overland flow, slow rate infiltration or irrigation, and high rate infiltration. Each of these processes could be applicable to cluster systems. The IDPH regulations do not allow land treatment systems as an approved technology. Conceivably, they could be permitted under the provisions for a variance or experimental use permit. IEPA regulations permit a 30/37 discharge from systems with a lagoon exemption and employing overland flow treatment for effluent polishing. No discharge is allowed from either slow rate or high rate infiltration processes.

If land treatment systems are only used for cluster projects over 1,500 gpd, the existing IEPA requirements would be appropriate and there would be no conflict with IDPH regulations. Limiting land treatment cluster systems to those over 1,500 gpd may be reasonable because of the additional operational needs of land treatment systems compared with seepage fields, filters or lagoons.

5.3 Economic

5.3.1 Grant Considerations

Cluster systems for upgrading on-site systems in small, unsewered communities or in urban fringe areas are eligible for Innovative/Alternative grant funding under the Federal Construction Grants Program. In fact, the regulations specifically require that

clusters or other small alternative wastewater systems be evaluated for these situations.

As administrator of the federal program, IEPA will certify such projects for funding if they are demonstrated to be cost-effective, long-term (at least 20-year) solutions. Although cluster systems may in some cases be the best technology for interim sewer service in a new subdivision which cannot be served by existing conventional systems, the EPA grants program would not fund these projects.

Recent changes in eligible funding categories may result in a significant shift toward cluster system solutions. After October 1, 1984, the only form of grant eligible sewer collection systems will be pressure, vacuum, and small diameter gravity sewers used in cluster systems.[168] This is because these pipes connect on-site pretreatment units to final treatment and disposal sites. Thus, they are considered as a component of the treatment process and are included in Funding Category I, Secondary Treatment.[35]

5.3.2 User Charge Systems for Publicly Managed Clusters

If a cluster project is funded under the Construction Grants Program, it is subject to the same requirements for equitable user financing as would be a conventional treatment system. In brief, this means capital funding for construction can be arranged in any satisfactory

manner desired by the local grantee. Funding for operation, maintenance, and replacement must be equitably distributed among system users based on actual use or service provided.

If the project is not funded under the Construction Grants Program, many different funding options are possible depending on the responsible public agency. For example, if a Sanitary District is formed, the revenue requirements spelled out in the Illinois State Statutes for Sanitary Districts would be applicable.

5.3.3 Requirements for Planned Clusters

Comparison of clusters with other wastewater alternatives in terms of project profitability and marketability of finished lots is a developer's concern. Costs to the developer and buyers will be affected by the position of local government on design standards, mandatory dedication, performance bonds or other guarantees, special provisions for "temporary clusters" where future interceptor extensions are planned, inclusion in or exclusion from sanitary districts and sewer-related property taxes, etc.

In most cases, planned clusters will be funded by private developers. In order for clusters to remain cost-effective compared with individual systems, it is important that local government regulatory and planning agencies establish reasonable policies for design standards, performance bonds and other concerns mentioned above.

5.4 Legal/Management

5.4.1 Management Entities

IDPH code only allows clusters "under joint ownership of the users" or "under public jurisdiction to ensure there is a responsible party for maintenace and repairs." We have interpreted the former as principally referring to incorporated owners or condominium associations. Present Illinois law only permits municipalities to establish on-site disposal zones; however, for planned clusters, such zones may be unnecessary since septic tanks or other appurtenances may be placed on dedicated easements or right-of-ways, eliminating the need for a legal right of access to private property.

Municipalities, townships, counties, and special districts could all be responsible management agencies for cluster systems in Illinois if they are authorized to own and operate public sewerage facilities under the Illinois State Statutes. EPA construction grants are normally awarded to municipalities or sanitary districts, but are also available to townships and counties.

Many of the review panel suggested that special districts such as sanitary districts would be the most appropriate public management choice because they are special purpose districts with one primary goal. Also, the need for clusters normally does not coincide with municipal or other governmental boundaries.

Whether the management entity is a public authority or a private homeowners' association, the most important consideration in determining the responsible management entity is that there be legal authority established which provides all the rights and powers needed to successfully own and operate the wastewater system.

5.4.2 Public Acceptance and Participation

For planned clusters, buyer acceptance or resistance may be assessed by the developer using standard market research techniques. For retrofit clusters, the grants program requires public participation in facilities planning to assure that there is adequate public awareness and support for the project.

For cluster systems, public involvement and support for the project from the initial stages is crucial to the success of the project. Although active participation does not necessarily result in public acceptance of the final plan, lack of participation clearly reduces the chances for success.

One question which is related to public participation involves the possible requirement for all homeowners to be included in a municipal disposal zone or special district regardless of whether their on-site system is failing. The consensus of the review panel was that the same legal authority that require hook-ups should exist for clusters as for conventional sewer systems. The Illinois statute on municipal disposal zones allows for zone boundaries not including all of the

municipality, but requires everyone within the boundary to participate. Some lawyers have expressed concern that common law precedents regarding private property rights may override such a requirement; however, a recent court case in Riverwoods, Illinois, found that a municipality has the authority to declare a private system is a nuisance... "unless its judgment and discretion is clearly erroneous."[80] One benefit of mandating full participation in areas where some individual systems appear to work right and others do not is that the systems still functioning may be expected to cause problems at some point in the near future.

5.4.3 Regulating Publicly-Owned Clusters

As with a conventional sewer system, regulations which limit dicharges are required for cluster systems to operate properly. In general, all the same restrictions such as limitations on pH, temperature, flammables, toxics and storm drain or sump pump connections would still apply. In addition, other special requirements such as mandatory septic tank cleaning at specified intervals, use of water conservation devices, or prohibition of garbage grinders may be appropriate, depending on the cluster technology employed.

Responsibility for enforcement and compliance of these sewer use regulations would normally rest with the management agency. Cooperation could be improved by public education explaining why each restriction is important and by including fines, fees and other enforcement provisions in the regulations.

One potential problem regards access to system components (e.g. septic tanks) located on private property. The Illinois Disposal Zone Act provides the authority to ensure adequate access, but easements may be desirable to reduce the potential for legal challenges. Also, design considerations such as location of on-site components and access hatches will minimize problems associated with on-site components.

Wherever possible, on-site components should be publicly-owned. If privately-owned components are included in the cluster system, user adherence to the established regulations should be a mandatory requirement for the privilege of being served by the cluster system.

5.4.4 Regulating Privately-Owned Clusters

Where cluster systems are privately-owned, local government does not have the authority to directly regulate the clusters; however, municipalities would have the authority to require zoning and planning approvals and to pass ordinances which are designed to protect the health and welfare of the residents. The latter regulatory role could be vested in the local health department (if within a municipality) or the Township Board of Health or County Health Department in unincorporated areas.

5.4.5 State Role in Cluster Regulation

By definition, clusters combine elements of on-site and centralized technology. In this situation, is it better to assign the primary regulatory responsibility to IDPH (which regulates principally on-site systems) or to IEPA (which regulates principally centralized systems)? As discussed previously, the present division of responsibility is current based on flow and type of discharge, with systems over 1,500 gpd and having a surface discharge under IEPA jurisdiction and smaller systems or systems with subsurface discharge under IDPH jurisdiction. An additional requirement is that all systems funded under the construction grants program are subject to IEPA approval. This division of responsibility between the two agencies may be appropriate, but there should be consistency established for design standards and effluent requirements such that a given cluster system technology has the same requirements for flows above or below 1,500 gpd. Currently, IDPH and IEPA requirements do differ, but a joint regulatory panel could be formed to develop consistent requirements for cluster systems.

5.4.6 Intergovernmental Agreements, Contracting for Services

In implementing cluster systems, municipalities or other responsible managing agency may arrange for local health departments or other agencies to perform some functions. Advantages of this approach are that the existing expertise of the health department can be utilized and requirements for additional staff can be reduced. These

advantages should be weighed against the disadvantages of losing some control over the system and a possible conflict between management and enforcement roles.

Where cluster systems serve more than one municipality, regionalization may be accomplished with each municipality forming a disposal zone and then contracting with a county or other regional body for management services. This would make good use of existing resources, but would be difficult to implement. Formation of a sanitary district would probably be preferable in this situation.

Once a cluster system is in operation, it may be preferable to contract out for some services. Typically, routine services such as septic tank cleaning are contracted to a private hauler, while monitoring and normal maintenance are performed by regular employees. In some instances, the entire operating responsibility may be contracted to a private concern. This approach is gaining popularity with conventional wastewater plants and could be equally desirable for cluster systems.

5.5 Land Use

5.5.1 Lot Size, Open Space and Development Density

IDPH codes do not specify the minimum lot size for use of on-site systems, but do set forth seepage areas, separation distances, reserve areas, etc. In general, a lot size of about one-half acre is required

to meet these requirements. Local ordinances often set a specific minimum lot size for the approval of on-site systems. A cluster system using on-site pretreatment units should not necessarily be required to meet these lot size restrictions.

5.5.2 Effect on Overall Development Pattern

In general, use of cluster systems can result in a higher density development than with individual on-site systems; however, subsequent growth may be restricted by the design capacity of the cluster system. This could result in no growth or in growth "spurts" associated with the addition of a new cluster system serving the new development. If several potential cluster treatment and disposal sites exist in a particular area, it may be preferable to add future cluster systems to parallel the growth demand rather than design the initial system for "ultimate" growth.

5.5.3 Timing of Development and Corporate Control

In contrast to development served by conventional sewer systems, development with cluster systems can occur in non-contiguous areas. Thus, allowing one new development with a cluster will not necessarily encourage other development in intervening space as would a new sewer. This may be desirable or undesirable depending on the long-range community plans. The appropriateness of clusters vs. sewer extensions should be evaluated on a case-by-case basis. In cases where eventual connection to a conventional sewer appears probable, clusters should

be designed to provide flexibility for future connection to the sewers.

If a proposed cluster development is within 1.5 miles of a municipality, state statutes provide legal authority for the municipality to approve the development plan. The considerations discussed above should apply equally whether the development is within the 1.5 mile limit or not.

5.5.4 Use of Clusters to Preserve Desired Land Resources

Where the undeveloped land between a potential cluster (retrofit or planned) and presently sewered areas includes prime or unique farmland, parks, natural areas, or other environmental resources, clusters can be used to help avoid additional development pressure on those land resources. However, zoning or establishing designated parks, etc., should be the principal method of controlling development in these areas.

Even where planned clusters may help achieve public goals, public funds should not be used to subsidize their construction directly. Under certain circumstances, publicly-backed low-interest loans could be used to assist in construction of a cluster system. Such loans would parallel similar loans used to spur industrial development. Direct public funding of planned clusters would be contrary to fundamental principles of the free-enterprise system. For retrofit clusters, public funding is appropriate to alleviate an existing water

pollution problem or health threat, just as construction grants funding is appropriate for upgrading conventional municipal wastewater systems.

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PERSONAL COMMUNICATIONS

	Name	Organization
155	Jack Abney	Parrot Ely and Hurt, Lexington, KY, May 14, 1981.

156	Gene Barnett	Texas Division of Sanitation, Austin, TX, May 13, 1981.
157	Tom Barthell	Koochiching County Mn. Sanitarian, September 1, 1983.
158	Ed Casne	Montana Water Quality Bureau, Helena, MT, May 13, 1981.
159	Archie Cloud	Ellison Philstron, St. Paul, MN, May 14, 1981.
160	Jim Feuss	Public Health Dept., Cortland, NY, September 1, 1981.
161	Al Fredericks	Monterey County Environmental Health Dept., October 23, 1981.
162	Nancy Goodell	Central Health District, Boise, ID, June 14, 1983.
163	Steven John	Environmental Planner, Decatur, IL, frequent contacts.
164	Saeed Kahn	Illinois Environmental Protection Agency, Springfield, IL, September 8, 1983.
165	Steve Kintner	Missouri Bureau of Water Pollution Control, Springfield, MO, May 11, 1981.
166	Jerry Kobb	Panhandle Health District, ID, October 21, 1981.
167	Ben Kor	Sonoma County Health District, ID, September, 1981.
168	Alfred E. Krause	U.S. EPA Region V, Chicago, IL, September 23, 1983.
169	Vincent Mattera	Rhode Island Land Resources Dept., September 17, 1981.
170	Dick Otis	Rural Systems Engineering, Madison, WI, frequent contacts.
171	Rich Phillips	Vermont AEC, May, 1981.
172	Mike Preston	JUB Engineers, Boise, ID, May 14, 1981.
173	Frank Rozich	Colorado Department of Public Health, May 12, 1981.
174	Otto Schalow	Crow Wing County Sanitarian, MN, August 21, 1981.

175	Gene Schuman	Schuman Associates, LaCrosse, WI, September 29, 1981.
176	Wayne Thomas	Utah Bureau of Water Pollution Control, May 13, 1981.
177	Herschel Trimm	Trimm Building Corp., Birmingham, AL, December, 1982.
178	Allan Young	Chromoglass Corporation, June 21, 1983.
179	Hal Wilkinson	An Luis Obispo County Engineering Dept., CA, September 17, 1981.
180	Teresa Wistrum	Central Water Quality Control Board, CA, September 29, 1981.

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APPENDICES

APPENDIX A Laws and Regulations

APPENDIX B Local Public Health Authorities

APPENDIX C Identified Cluster Systems

APPENDIX D Review Panel Members

APPENDIX E Model Ordinances

APPENDIX A

APPENDIX A

LAWS AND REGULATIONS

Illinois Laws and Regulations

1. Environmental Protection Act, Illinois Revised Statutes, Chapter 111 1/2. Paragraph 1001-1051, as amended through January 1, 1983, available from Illinois Environmental Protection Agency, Springfield, Illinois.

2. Water Pollution Control Rules, Illinois Pollution Control Board, Title 35, Subtitle C, Chapter 1, as amended through December 1, 1982, available from Illinois Environmental Protection Agency, Springfield, Illinois.

3. Private Sewage Disposal Licensing Act and Code, Illinois Department of Public Health, Illinois Revised Statutes Chapter 111 1/2, Paragraph 116.301-116.324, 1982 Edition, available from Illinois Department of Public Health, Springfield, Illinois.

4. Municipal Wastewater Disposal Zones Act, Illinois Revised Statutes, Chapter 24, Paragraphs 1401-1422, as revised through 1981.

5. Sanitary District Acts, Illinois Revised Statutes, Chapter 42, Paragraphs 247-381, as revised through 1981.

6. Public Water Districts Act, Illinois Revised Statutes Chapter 111 2/3, Paragraph 188-212.16, as revised through 1981.

Federal Laws and Regulations

1. Clean Water Act Amendments of 1981, P.L. 97-117, and Environmental Protection Agency Rules and Regulations, Federal Register, 47 (92), May 12, 1982.

APPENDIX B

APPENDIX B

LOCAL PUBLIC HEALTH AUTHORITIES

Addresses and phone numbers of each unit of local government which acts as the IDPH agent, and each unit of local government which administers its own private sewage disposal ordinance.

Region 1

BOONE COUNTY HEALTH DEPARTMENT

Courthouse

Belvidere, IL 61008

815/544-2951

DE KALB COUNTY HEALTH DEPARTMENT

2337 Sycamore Road

DeKalb, IL 60115

815/758-6673

JO DAVIESS COUNTY HEALTH DEPARTMENT

311 South Main Street

Galena, IL 61038

815/777-0263

LEE COUNTY HEALTH DEPARTMENT

144 North Court

Dixon, IL 61021

815/284-3371

OGLE COUNTY HEALTH DEPARTMENT

106 South Fifth Street

Oregon, IL 61061

815/732-3201

STEPHENSON COUNTY HEALTH DEPARTMENT

15 North Galena Avenue

Freeport, IL 61032

815/235-8271

WHITESIDE COUNTY HEALTH DEPARTMENT

Route #2

Morrison, IL 61270

815/962-5092

WINNEBAGO COUNTY HEALTH DEPARTMENT

401 Division Street

Rockford, IL 61108

815/962-5092

*Designated Agents of the State

Region 2

FULTON COUNTY HEALTH DEPARTMENT

700 E. Oak Street

Canton, IL 61520

309/647-1134

PEORIA COUNTY HEALTH DEPARTMENT

2116 North Sheridan Road

Peoria, IL 61604

309/685-6181

HENRY COUNTY HEALTH DEPARTMENT*

R.R. #4

Geneseo, IL 61254

309/944-2167

ROCK ISLAND COUNTY HEALTH DEPT.*

2116 - 25th Avenue

Rock Island, IL 61201

309/793-1955

KNOX COUNTY ZONING DEPARTMENT

Knox County Court House

Galesburg, IL 61401

309/343-3121

TAZEWELL COUNTY HEALTH DEPARTMENT

R.R. #1

Tremont, IL 61568

309/925-5511

LA SALLE CO. BOARD OF SUPERVISORS

827 Columbus Street

Ottawa, IL 61350

WOODFORD COUNTY ZONING DEPARTMENT

P.O. Box 81

Eureka, IL 61530

309/467-3023

*Designated Agents of State

Region 3

ADAMS COUNTY HEALTH DEPARTMENT

333 North Sixth Street

Quincy, IL 62310

217/222-8440

CALHOUN COUNTY HEALTH DEPARTMENT

P.O. Box 75

Hardin, IL 62047

618/576-2428

CHRISTIAN COUNTY HEALTH DEPARTMENT

Courthouse

Taylorville, IL 61568

217/824-4113

JERSEY COUNTY HEALTH DEPARTMENT

213 East Spruce, P.O. Box 69

Jerseyville, IL 62052

618-498-9565

*Designated Agents of State

MACOUPIN COUNTY HEALTH DEPARTMENT

209 E. 1st Street

Carlinville, IL 62626

217/854-5761

MONTGOMERY COUNTY HEALTH DEPARTMENT

2605 Main, Box 128,

2nd Floor, Courthouse

Hillsboro, IL 62049

217/532-6138

MORGAN COUNTY HEALTH DEPARTMENT

466 East State Street

Jacksonville, IL 62650

217/245-5111

PIKE COUNTY HEALTH DEPARTMENT

218 North Memorial

Pittsfield, IL 62363

217/285-4407

SPRINGFIELD DEPT. OF PUBLIC HEALTH

1415 East Jefferson Street

Springfield, IL 61703

217/789-2182

Region 4

BOND COUNTY HEALTH DEPARTMENT*

503 South Prairie

Greenville, IL 62246

618/664-1442

EAST SIDE HEALTH DISTRICT

638 North 20th Street

East St. Louis, IL 62205

618/939-9111

FAIRVIEW HEIGHTS, CITY OF

10025 Bunkum Road, Box 3127

Fairview Heights, IL 62208

618/397-9111

MADISON COUNTY ENVIRONMENTAL CONTROL DEPARTMENT

219 North Main

Edwardsville, IL 62025

618/692-4564

MONROE COUNTY HEALTH DEPARTMENT

224 East Third Street

Waterloo, IL 62298

618/939-8681

RANDOLPH COUNTY HEALTH DEPARTMENT

P.O. Box 590

Chester, IL 62233

618/826-5007

ST. CLAIR LAND DEVELOPMENT DEPT.

10 Public Square

Belleville, IL 62220

618/277-6600

*Designated Agent of the State

Region 5

EFFINGHAM COUNTY HEALTH DEPARTMENT*

901 West Virginia, P.O. Box 685

Effingham, IL 62401

217/342-9237

EGYPTIAN HEALTH DEPARTMENT+*

Route 45

Eldorado, IL 62930

618/273-3326

+Gallatin County

+Saline County

+White County

FRANKLIN-WILLIAMSON BI-COUNTY HEALTH DEPARTMENT

217 East Broadway

Johnston City, IL 62951

618/684-3143

*Designated Agent of State

JACKSON COUNTY HEALTH DEPARTMENT

342A North Street

Murphysboro, IL 62966

618/684-5143

LAWRENCE COUNTY HEALTH DEPARTMENT*

Courthouse

Lawrenceville, IL 62439

618/943-3302

PERRY COUNTY HEALTH DEPARTMENT

102 South Walnut

Pinckneyville, IL 62274

618/357-9631

SOUTHERN SEVEN HEALTH DEPARTMENT+

R.R. #1

Ullin, IL 62992

618/634-2297

+Alexander County
+Hardin County
+Johnson County
+Massac County
+Pope County
+Pulaski County
+Union County

Region 6

COLES COUNTY HEALTH DEPARTMENT

825-10th Street

Charleston, IL 61920

217/348-0530

DEWITT COUNTY HEALTH DEPARTMENT

122 East Main Street

Clinton, IL 61727

217/935-3427

DOUGLAS COUNTY HEALTH DEPARTMENT

County Courthouse

Tuscola, IL 61953

217/253-4137

FORD-IROQUOIS PUBLIC HEALTH DEPT.

123 North Eighth

Watseka, IL 60970

815/432-2483

LIVINGSTON COUNTY HEALTH DEPARTMENT

R.R. #4

Pontiac, IL 61764

815/844-7174

MACON COUNTY HEALTH DEPARTMENT

1085 South Main Street

Decatur, IL 62521

217/423-6988

MC LEAN COUNTY HEALTH DEPARTMENT

905 North Main Street

Normal, IL 61761

309/454-1161

PIATT COUNTY HEALTH DEPARTMENT

122 East Main Street

Clinton, IL 61727

217/935-3427

VERMILION COUNTY HEALTH DEPARTMENT

R.R. #1, Box 12 B, Tilton Road

Danville, IL 61832

217/446-4536

*Designated Agent of the State

Region 7

GRUNDY COUNTY HEALTH DEPARTMENT*

1340 Edwards Street

Morris, IL 60450

815/942-0333

LAKE COUNTY HEALTH DEPARTMENT

3010 Grand Avenue

Waukegan, IL 60085

312/689-6700

KANE COUNTY GOVERNMENT CENTER

719 South Batavia Avenue

Geneva, IL 60134

312/232-8018

WILL COUNTY HEALTH DEPARTMENT

501 Ella Avenue

Joliet, IL 60433

815/727-8480

KENDALL COUNTY HEALTH DEPARTMENT

P.O. Box 549

Yorkville, IL 60560

312/533-5216

Region 8

COOK COUNTY HEALTH DEPARTMENT*

1500 South Maybrook Drive

Maywood, IL 60153

312/865-6100

PALOS PARK, VILLAGE OF

8901 West 123rd Street

Palos Park, IL 60464

312/448-2700

*Designated Agent of the State

APPENDIX C

APPENDIX C

IDENTIFIED CLUSTER SYSTEMS
(PLANNED)

Name	Location	Designer	Firm/City	Number of Units
Ranier	Ranier, MN	Tom Angus	Ellison Philstrom, St. Paul, MN	100-150 design; 8-120 actual residential and commercial, 1 ST/1 mound
Sawyer Rapids Resort	Elkton, OR	Harold Ball	BHW Engineering, Roseburg, OR	1 restaurant, 23 units, 1 ST, 2 SAS Trench
Morgan Heights	Fort Morgan, CO	Frank Rozich	Water Quality Control Division Denver, CO	13 units 1 ST-3 seepage pits
	LaCrosse, WI	Gene Schuman	Schuman & Associates, LaCrosse, WI	26 units, individual ST-1 SAS-mound
Shiloh Village	Billings, Montana	John Stewart	Sanderson, Stewart & Gaston, Eng. Billings, Montana	196 actual units 200 planned 3 ST 2 SAS beds
Spring River Acres	Spring River, OR	George Cook	High Desert Engineering, Inc. Bend, Oregon	11 design; 3 actual individual ST - SAS be
Ranch Village Mobile Home Park	Bend, OR	Dave Hoerning	Colvin and Hoerning, Bend, OR	288 units planned 2-17 ST/home SAS trenches
Auburn Lake Trails	El Dorado County		Georgetown Divide Public Utility District	Cluster system

Name	Location	Designer	Firm/City	Number of Units
	Atkinson, NH		Lewis Builders	48 units 4 aerobic units 4 mounds
	Morstein, PA	Paul Lanni	Lanni Construction Co.	5,000 gallon aerobic unit, SAS
	Downington, PA	Fred Betz		40 units; 4 aerobic units 4 SAS
LeRichelieu Townhouses	Birmington, AL	Herschel Trimm	Trimm Building Corp.	43 townhouses; 11 aerobic units 11 SAS trenches
Country Times Mobile Home Park	Porter, TX	Richard Schmidt		17 mobile homes; 5000 gallon aerobic unit, SAS bed
Brook Hollow Estates	Ada County, Idaho	Mike Preston	JUB Engineering, Boise, Idaho	225 homes; 1 septic tank 1 SAS
Maple Hills Subdivision	Boise County, ID	Mike Preston	JUB Engineering, Boise, Idaho	1 septic tank and seepage pit/2-13 homes
Subdivision	Boise County, ID	Mike Preston	JUB Engineering, Boise, Idaho	70 houses; 45 individual ST/SAS; 25 ST to one SAS
Countryman Estates S-Mile Estates North Grassy Meadows	Boise County, ID area	Mike Preston	JUB Engineering, Boise, Idaho	Subdivision of various sizes; 1 ST/SAS/ 2 houses
Rush Lake	Rush Lake, MN	John Davidson Chuck Wexler	Tolts, King, Dubelle & Anderson St. Paul, MN	16 houses now, 13 more planned, 29 units individual ST-3 SAS

Name	Location	Designer	Firm/City	Number of Units
	Black Butte, OR		Century West Engineers, Bend, OR	60 units; individual ST - STEP - secondary treatment
	Port Charlotte, FL		General Development Utilities Engineers, Miami, FL	62 current; individual ST - STEP - secondary treatment
	Port St. Lucie, FL		General Develpment Utilities Engineers, Miami, FL	191 units; individual ST - STEP - secondary treatment
	Glide-Idleywild OR		Parametrix, Inc. Eugene, OR	600 units; individual ST - STEP - secondary treatment

IDENTIFIED CLUSTER SYSTEMS
(RETROFIT)

Name	Location	Designer	Firm/City	Number of Units
Romaine Village	Bend, OR	Dave Williams George Cook	High Desert Engineering, Inc. Bend, OR	176 units - 5 ST - 5 SAS beds
Mill City	Mill City, OR			20 units
Bottle Bay	Bottle Bay, ID	Dick Price	Durgschi Engineering	60-100 units, individual ST SDGS and pressure - lagoon
Cromwell	Cromwell, MN	Archie Cloud	Ellison Philstron, St. Paul	40 units, individual ST - STEP - SAS mound
Ranier, Minnesota	Ranier, MN		Ellison Philstron, St. Paul	30-50 units, individual grinder pump - 1 ST - SAS - mound
Mark West Estates	Sonoma County			1 3900 gallon ST - 1 SAS
Lincolnwood Edition #7	Missoula, MT		Stensatter Druyvestan & Assoc. Missoula	21 units, 1 ST - 1 SAS trench
Joe Santa Maria M.H.P.	Del Norte County CA	Teresa Wistrum		10 units, 1 ST 1 SAS
E Z Living M.H.P.	Mendicino County CA	Teresa Wistrum		27 units, 1 ST - 1 SAS
Rowdy Creek M.H.P.	Mendicino County CA	Teresa Wistrum		13 units, 1 ST - 1 SAS
Indianola M.H.P.	Humboldt County CA	Teresa Wistrum		90 units, 1 ST/SAS
Towe Harris M.H.P.	Del Norte County County, CA	Teresa Wistrum	Winzler & Kelly, Humboldt County	50 units, 4 ST - 4 SAS

Name	Location	Designer	Firm/City	Number of Units
Gerald Storm M.H.P.	Mendicino County CA		Teresa Wistrum	53 units, 2 ST - 2 SAS
North Crest Trailer City	Del Norte County CA		Teresa Wistrum	85 units, 3 ST, 3 SAS
Sandra Moen M.H.P.	Del Norte County CA		Teresa Wistrum	6 units, 1 ST/SAS
Tremaine M.H.P.	Sullivan TWP, WI	Al Poeschl	Poeschl & Associates, Wakasha	100 units, 1 ST/SAS failed biodisk
Village of Canterbury	Buckingham TWP PA	Robert C. Schmawk	Gilmore and Associates, Inc. New Britain	17 units, 1 ST/2 SAS
Madison Project	Pine Hill Burrough, NJ	George Chajowsky	Anders Engineering, Inc. Vorhees	104 units, 3 SAS, 8 SAS trenches
Maplewood Sanitary District	Door County, WI	Gary Radtke Gerry Dassler	Foth and Van Dyke, Green Bay	60-45 residential, 15 commercial, 53 ST/3 SAS
Nipomo Palms Mobile Home	Nipomo, CA	Ed Niery	James Montgomery Engineering San Luis Obispo	71 units
Montecido Verde	Nipomo, CA	Edward Niery	James Montgomery Engineering San Luis Obispo	49 units, 1 ST/52 seepage pits
Village Greens	Carmel Valley Village, CA		Bestor Engineers, Monterey	
Rochester	Rochester, VT	John Riordan	Duboise & King, Randolph	132 units, 3 ST, 3 SAS trench
East Rygate	East Rygate, VT		Dufresne-Henry, Montpelier	30 units, 1 paper mill, 2 ST, 2 SAS amoration chambers
Vista Del Oro	Los Osos, CA	Robert Williams	Central Coast Engineering San Luis Obispo	73 units, 1 ST, 20 seepage pits, 3 SAS trench

Name	Location	Designer	Firm/City	Number of Units
Hyde Park	Hyde Park, VT	Mr. Sullivan	Webster Martin, S. Burlington	2 ST, 4 SAS beds
Cuyler Hamlet	Cuyler, NY	Hayne Smith	John McNeil, Jr., Homer	39 units, 2 ST, 2 SAS
North Long Lake	Crow Wing County MN	Warren Southworth	RCM Associates, Brainerd	30-40 units, 1 ST, 6 SAS trench
North Star Resort	Pelican Rapids MN	Malcom Lee	Land & Resources Section - Otter Tale County, Perham	38 units, dump station, 1 ST SAS bed
Little McDonald Lake	Pelican Rapids MN	Malcom Lee	Land & Resources Section - Otter Tale County, Perham	23 units, individual ST, 1 SAS bed
Sandee Cove	Pelican Rapids MN	Malcom Lee	Land & Resources Section - Otter Tale County, Perham	14 units, 1 ST/2 houses, 2 SAS beds
Black Lakes Estates (Mobile Homes)	Nipomo, CA	Robert Williams	Central Coast Engineering San Luis Obispo	112 units, several ST, 1 SAS bed, 10 seepage pits
Galaxy Park (mobile homes)	Nipomo, CA	Edward Niery	James Montgomery Engineering San Luis Obispo	67 units, 3 ST 12,000 gal. i series, 15 seepage pits; 82 units, 1 ST (37,500 gal.) 15 seepage pits
Laguna Seca Ranch	Monterey, CA		Bestor Engineers, Monterey	150 units, several ST, seepage pits
Hurlbut M.H.P.	Mendicino County CA		Teresa Wistrum	30 units, 4 aerobic units, 1 SAS
Fillmore, Illinois			John Crawford Associates	190 units, ST-SDG
Harrison, Idaho			URF Engineering	70-100 units ST-SDG, aerated lagoon
Avery	Shoshone County ID	Larry Comer	V. David Welch Engineering	25 units, ST-SDG, 2 SAS beds

Name	Location	Designer	Firm/City	Number of Units
Moon Gulch	Shoshone County ID	Larry Comer	V. David Welch Engineering	57 units, ST-SDG secondary treatment plant (may not be operational)
Terror Gulch	Shoshone County ID	Larry Comer	V. David Welch Engineering	27 units, ST-SDG secondary treatment (may not be operational)
2-mile	Shoshone County ID	Larry Comer	V. David Welch Engineering	27 units, ST-SDG secondary plant (may not be operational)
9-mile	Shoshone County ID	Larry Comer	V. David Welch Engineering	20-30 units, ST-SDGS, SAS bed (may not be operational)
Calder	Shoshone County ID	Larry Comer	V. David Welch Engineering	40 units, ST-SDGS, SAS bed
Kenneth, MN			McComb Knutson	39 units, ST-SDGS-SAS
Waxhaw, NC		Bo Morfield	Kockinos and Associates	100 units, ST-SDGS, spray irrigation (may not be operational)
Rothsday Camp	Pelican Rapids MN	Malcom Lee	Ottertail County	15 units, ST-SDGS-SAS
Dunvilla	Pelican Rapids MN	Malcom Lee	Ottertail County	21 units, ST-SDGS-SAS
Sandee Cove	Pelican Rapids MN	Malcom Lee	Ottertail County	14 units, ST-SDGS-SAS
Little McDonald Lake	Pelican Rapids MN	Malcom Lee	Ottertail County	23 units, ST-SDGS-SAS
Gardner, NY			Ericson & Silber	120 units, ST-SDG-sand filter

Name	Location	Designer	Firm/City	Number of Units
Beecher City, IL		Jack Mitchell	Architectural and Engineering Services Corporation	230 units, ST-SDG-sand filte
Newcastle, VI		Gary Crouch	Ken Anderson & Associates	500 units, ST-SDGS-aquaculture
Waynesville, IL		Jack Mitchell	Architectural and Engineering Services Corporation	100 units, ST-SDGS-mound
Westboro, WI			Rural Systems Engineers	ST-SDG-1 SAS bed
Mt. Andrew, Alabama		Cecil Rose	Farmers Home Administration and others	31 units SDGS-lagoon
South Corning, NY		Dennis Fagen	Philip J. Clark Consulting Engineers	600 (12 below grade on pressure line)
Miranda, CA	Humboldt County	Marilyn Miller	Winzler & Kelly	100 units, ST-SDGS-sand filter
Badger, South Dakota		Larry Doss	Doss Engineers	ST-SDG-SAS-ET
Harrison, Idaho			URS Engineers, Spokane, WA	120 units, individual ST-STE
Cooper Communities	Bentonville, AR		Blaylock, Threet & Associates Little Rock	75 units, individual ST-STEP extended aeration
Bend, OR			C&G Engineers, Salem	11 units, individual ST-STEP
Coolin, Idaho			K.A. Durtschi & Associates Couer D'Alene	356 units, individual ST-STE
Kalispell Bay, ID			K.A. Durtschi & Associates Couer D'Alene	232 units, individual ST-STE
Town of Sabbattus	Maine			Pressure sewers, community septic tank, sand filter

Name	Location	Designer	Firm/City	Number of Units
Town of Vassalboro	Maine			Cluster community septic tank system, sand filtration
Town of Islesboro	Maine			Community septic tank system, sand filtration
Town of Newport	Vermont			Septic tank, small diameter collector, sand filter (may not be operational)
Town of Glover	Vermont			Septic tank, underdrain sand filter, and chlorination (may not be operational)
Gardner-Ulster County	New York			Small diameter gravity sewers, septic tank, sand filter (may not be operational)
New Paultz (Township and Village)	New York			Grinder pumps, pressure sewers, septic tanks, sand filter (may not be operational)
York	New York			Community septic tank, sand bed filter (may not be operational)
Sanford	New York			Septic tanks, small diameter sewers & mound systems (may not be operational)
Woodstock	New York			Small diameter gravity sewers septic tanks, aquaculture (may not be operational)

Name	Location	Designer	Firm/City	Number of Units
Tusten	New York			Septic tank effluent collection system, UV disinfection (may not be operational)
Delaware (Township and Village)	New York			Community septic system (may not be operational)
Lawrence	New York			Cluster disposal system, small diameter gravity collectors (may not be operational)
Bergen	New York			Septic tanks, small diameter sewers, soil absorption treatment site (may not be operational)
Newfield	New York			Septic tanks, effluent pumps, small diameter gravity sewers subsurface disposal (may not be operational)
Ridgeway	New York			Septic tanks, soil absorption system and small diameter gravity sewers (may not be operational)
Rushville	New Jersey			Septic tanks, small diameter gravity sewers (may not be operational)
Town of Boones Mill STP	Virginia			Onsite treatment systems, community septic tank, package treatment plant, subsurface disposal (may not be operational)

Name	Location	Designer	Firm/City	Number of Units
Grottoes	Virginia			Septic tanks, small diamet gravity sewers (may not be operational)
Upper Augusta Township	Pennsylvania			Septic tanks, small diamet collectors (may not be ope tional)
Emlenton	Pennsylvania			Pressure sewers, community septic tank (may not be operational)
Fountain Run	Kentucky			Septic tank systems, small diameter sewers, community disposal sites, public ownership and management
Sadieville	Kentucky			Small diameter gravity sewers (may not be operational)
Town of Shallotte	North Carolina			Septic tanks, effluent pumps, pressure sewers, lagoon, disinfenction and spray irrigation (may not operational)
Waxhaw Union County	North Carolina			Grinder and effluent pumps pressure and small diamete gravity collectors (may no be operational)
Lafayette	Tennessee			Small diameter step system

Name	Location	Designer	Firm/City	Number of Units
Waynesville	Illinois			Septic systems, individual and cluster systems with dual mound drain fields (may not be operational)
Beecher City	Illinois			Small diameter collection systems, recirculating sand filter (may not be operational)
Mill Shoals	Illinois			Individual septic tanks, small diameter collectors, aerated lagoon, dual sand filters (may not be operational)
Elsah	Illinois			Septic tanks, pressure sewers (may not be operational)
Vergennes	Illinois			Septic tank, small diameter gravity sewers, recirculating intermittent sand filter (may not be operational)
Filmore	Illinois			Septic tanks, small diameter gravity sewer, lagoon, overland flow (may not be operational)
Grantfork	Illinois			Septic tanks, small diameter gravity sewer, lagoon, spary irrigation (may not be operational)

Name	Location	Designer	Firm/City	Number of Units
Shipman	Illinois			Septic tank, small diameter gravity sewer, recirculating intermittent collection filter (may not be operational)
Summerfield	Illinois			Septic tanks, small diameter gravity sewers, recirculatin intermittent sand filter (may not be operational)
West Traverse Township	Michigan			Community septic tank, dosing tank and drain fields
Michigamme Two Marquette Co.	Michigan			Septic tanks, pressure sewer grinder pumps, subsurface drain fields
Sagola Township	Michigan			Community septic tanks and drainfields (may not be operational)
Pine River Sanitary District	Minnesota			Community septic tank, soil absorption fields, sludge composting (may not be operational)
Carver Co.	Minnesota			Individual and cluster septic tanks/mounds (may not be operational)
Cromwell	Minnesota			Community septic tanks and drainfields (may not be operational)

Name	Location	Designer	Firm/City	Number of Units
Fountain	Minnesota			Septic tanks small diameter gravity sewers (may not be operational)
Holland	Minnesota			Individual cluster septic tanks and drainfields (may not be operational)
Lake Monroe RWD	Indiana			Small diameter gravity sewers, septic tank effluent, septage hauling vehicle (may not be operational)
Quitman	Arkansas			Rehabilitate septic tanks, small diameter gravity sewers, oxidation ditch, lagoon (may not be operational)
Millard	Missouri			Small diameter gravity sewers (may not be operational)
City of Lankin	North Dakota			Septic systems, effluent pumps, pressure sewers, land treatment (may not be operational)
Town of Cayuga	North Dakota			Small diameter effluent system (may not be operational)
Town of Clifford	North Dakota			Small diameter effluent system, community mound

Name	Location	Designer	Firm/City	Number of Units
Lincoln SD	Montana			Small diameter effluent collection system, septic tanks (may not be operational)
Taylorsville	California			Septic systems, individual, cluster, dual mound drainfields
San Bernardino County, Sears Valley	California			Community septic tanks, leachfield, transmission line
Manila Community Service District	California			Pumping unit transmission line, leachfield, community septic system, effluent pump station, community leachfield
Edgerly, Napa Co.	California			Small diameter pressure sewers, effluent pumps, community mound, septic tanks (may not be operational)
Calaveras County	California			Small diameter gravity collection system, spray disposal
Miranda	California			Small diameter gravity sewers, STEP systems, recirculating sand filter
Ventura	California			Step system for four communities

Name	Location	Designer	Firm/City	Number of Units
Dexter WWMS Lane County	Oregon			Rehabilitate individual systems, small diameter sewers to holding tanks, recirculating sand filter, community leachfield (may not be operational)
Dryden WWF Cheland County	Washington			Community septic tank and drainfields
Avery Sewerage Facilities	Idaho			Septic tank effluent, small diameter pressure sewer line, community absorption area
Town of Ashton	Idaho			Septic tank, pressure sewer, community leachfield

APPENDIX D

APPENDIX D

Wastewater Cluster Systems

Review Panel

State Agencies:

Illinois Department of Energy and Natural Resources:

1. Walter Zyznieuski
   Energy and Environmental Affairs Division
   325 W. Adams, Room 300
   Springfield, IL 62706

2. Ralph Evans
   State Water Survey Division
   Foot of MacArthur Highway
   Peoria, IL 61602

3. Thomas Johnson
   State Geological Survey Division
   615 E. Peabody
   Champaign, IL 61820

Illinois Department of Public Health:

4. David Antonacci and Douglas Ebelherr
   Division of Engineering and Sanitation
   535 W. Jefferson
   Springfield, IL 62761

5. Frank Alai
   Peoria Regional Office
   5415 N. University
   Peoria, IL 61614

Illinois Environmental Protection Agency:

6. Michael Bowers
   Grant Administration Section
   2200 Churchill Road
   Springfield, IL 62706

7. James Leinicke
   Grant Administration Section
   2200 Churchill Road
   Springfield, IL 62706

8. Saeed Kahn
Permits Section
2200 Churchill Road
Springfield, IL 62706

Federal Agencies:

United States Environmental Protection Agency:

9. Al Krause, SWFP-12
USEPA Region V
230 S. Dearborn
Chicago, IL 60604

County Departments:

Tazewell County Health Department:

10. Charles Skogley
R.R. 2
Tremont, IL 61568

Local Governments:

Village of Magnolia:

11. Warren Stout
Magnolia, IL 61336

City of Peoria:

12. Stephen Van Winkle
Director of Public Works
419 Fulton
Peoria, IL 61605

Private Developers:

Jenn Realty:

13. Harold Jenn
Lake of the Wood Plaza
Dunlap, IL 61525

Noah Herman & Sons:

14. Howard Herman
3100 N. Dries Lane
Peoria, IL 61604

Consultants:

Lake Michigan Federation:

15. Kathleen Brennan
    53 W. Jackson Boulevard
    Suite 1710
    Chicago, IL 60604

Rural Systems:

16. Richard Otis
    RSE, Inc.
    5708 Odana Road
    Madison, WI 53719

APPENDIX E

APPENDIX E-1

Model Ordinances to Form a Municipal Disposal Zone

As discussed in Chapter 2, for a retrofit cluster system utilizing USEPA construction grant funds, establishment of an on-site wastewater disposal zone is normally required to assure that the system can receive adequate operation, maintenance, and financial support.

In 1978, the Illinois General Assembly enacted Public Act 80-1371 (Illinois Revised Statutes Chapter 24, Sections 1401 through 1422), hereafter referred to as the "Act," which allows municipalities to form on-site wastewater disposal zones. and provides certain requirements which must be met. The Act does not specify whether or not a zone formed under the provisions of the Act can include property located outside the corporate limits of the municipality seeking to form the zone. Impliedly, it would appear that a zone can be formed only within the corporate limits of a municipality. In order to create a municipal wastewater disposal zone, a two step procedure must be followed.

The first step in the procedure can be initiated in two alternative ways. Under the first alternative, the corporate authorities of a municipality may elect to pass an ordinance declaring that it is the intention of the municipality to form such a zone. A model ordinance making such a declaration of intention is attached hereto and discussed in detail in the following section. Under the second alternative, a proposal to form a zone may be initiated by the filing of a petition with the corporate authorities. The requirements of such a petition are set forth in Section 1407 of the Act.

At such time as a municipality declares its intention to form a zone by ordinance or at such time as a petition for the formation of such a zone is received by the corporate authorities, a public hearing on the question of the formation of the proposed zone must be held. "Interested owners of real property" (Section 1410 of the Act) are permitted to appear and present matters material to the issue of forming the zone. Written protest to the formation of the zone may be filed or withdrawn at any time prior to the conclusion of the hearing. While the statute is not specific, it appears that written protests may be received only from voters residing in the proposed zone or the owners of real property in the proposed zone. The content of a valid written protest is not set forth in the Act.

At the conclusion of the public hearing, the corporate authorities may proceed with the second step in the procedure, depending upon the number of written protests which have been filed. The Statute at this point appears to be quite ambiguous. Under certain conditions, the corporate authorities are required to abandon the proceedings, while under other conditions the corporate authorities may proceed to establish the zone. It appears to be possible that both a condition requiring abandonment of the proceedings and a condition permitting the municipality to establish the zone can exist simulanteously. This

obviously is not the intent of the legislature. It would appear, therefore, that the corporate authorities of the municipality should proceed to establish the zone only if written protests number less than 51 persent of the voters residing within the proposed zone and also number less than 51 percent of the owners of real property in the proposed zone who own 51 percent of the assessed value of the real property within the proposed zone. Assuming that the corporate authorities determine that may proceed to establish the zone, a second ordinance to establish the zone must be passed. A model ordinance providing for the establishment of the zone is also included in this appendix.

In general, the suggested ordinances should not be used directly with only the blanks filled in. Rather, each section should be reviewed with respect to the particular cluster system plan and the needs of the local community. When a proposed ordinance has been drafted to the satisfaction of the corporation counsel, engineering consultant, and other local authorities, it should be submitted to the Illinois Environmental Protection Agency (IEPA), Illinois Department of Public Health, or other appropriate regulatory agency for their review prior to enactment. This should reveal any possible conflicts with state and federal requirements.

To assist in using and interpreting the model ordinances, each model ordinance is separately discussed together with some of the more important considerations for each section of each model ordinance.

COMMENTS ON ORDINANCE DECLARING INTENTION TO ESTABLISH A WASTEWATER ZONE

The first ordinance declares the intention of the municipality to form an on-site wastewater disposal zone pursuannt to the provisions of the Act. Section 1405 of the Act outlines seven items which must be included in every municipal ordinance passed to establish such a zone. The model ordinance presented at the end of this discussion incorporates these required provisions and others.

Article 1. Definitions

A well written ordinance should include definitions of all technical terms, shortened phrases, and other terms which may have more than one interpretation. The model ordinance includes only the more important definitions; others may be desirable in certain situations.

This article typically appears at the beginning of the ordinance, but some municipalities may prefer to place definitions at the end of the ordinance to be consistent with past practice.

Article 2. Boundaries

Description of the boundaries of the on-site disposal zone is required by the Act. Inclusion of a map is optional and may not be necessary if the boundaries can easily be described, such as if coincident with the municipal limits. If a map is omitted, then a legal description of the boundaries should be included instead.

Article 3. Public Benefit

A statement regarding the public benefit of a proposed on-site disposal zone is also required by the Act. The model ordinance includes typical public benefits that would apply. Any inapplicable items (such as applying for grants) should be omitted.

Article 4. Wastewater Disposal System

Act requires a description of on-site wastewater systems (Section 1 in ordinance) and a general description of the proposed plan for wastewater disposal (Section 2 in ordinance). For most cluster systems, the on-site systems would include some type of pretreatment step and a portion of the collection system. The proposed plan for wastewater disposal should include a description of the entire wastewater system, including both on-site and publicly-owned facilities.

The size of the system (Section 3) must be provided in accordance with the Act.

Article 5. Inspections, Operation, and Maintenance

Most of the provisions of this article are powers and duties granted to the municipality by provisions of the Act. Thus, it is not mandatory to include these verbatim in the local ordinance. There are both potential advantages and disadvantages to including these provisions in the local ordinance. From a legal aspect, it is probably preferable to include only a reference to powers granted by the Act. Then in the event of any subsequent changes to the Act, the local ordinance would remain in conformance. However, from a public information aspect, it is probably preferable to include these provisions in the local ordinances. For the latter reason, it is recommended that the major powers and duties granted by the Act also be included in the local ordinance.

Article 6. Method of Financing Operations and Construction

The method of financing operation, maintenance, and replacement costs (Section 1) must be included in the local ordinance. If USEPA grant money is funding a portion of the project, a user charge system is required. If no grant funds are involved, the municipality can propose any other financing arrangement which would generate the required revenue, consistent with their authorized powers to levy taxes, etc.

The method of financing capital costs for project construction (Section 2) is normally by issuance of revenue bonds or general obligation bonds, but may be by any other acceptable method. If taxes are to be levied to retire the bonds, then certain notification requirements must be met in conformance with the Act.

Article 7. Public Hearing

The public hearing requirements prior to formation of an on-site wastewater zone are mandated by the Act. The hearing must be held 30 to 60 days after adoption of the ordinance declaring intention to form a zone (or the receipt of a petition containing a sufficient number of signatures). The ordinance or the petition, as the case may be, must be published in its entirety in a newspaper of general circulation within the municipality no later than 10 days prior to the date established for the public hearing.

Article 8. Validity, and
Article 9. Ordinance in Force

These are standard provisions in any local ordinance and should be modified if necessary to be consistent with the wording and format normally used by each municipality.

COMMENTS ON ORDINANCE ESTABLISHING MUNICIPAL WASTEWATER DISPOSAL ZONE

Assuming that the municipality is not prohibited from proceeding by the number of written protests filed, the municipality may then declare the establishment of the proposed zone by passing a second ordinance. The model ordinance in its preamble sets forth a number of recitations designed to demonstrate that conditions precedent to the adoption of the ordinance have been met. The first recitation sets forth that an ordinance declaring the intention of the municipality to form the zone has been passed. Obviously, if the proceedings were initiated by petition, this recitation should be appropriately modified. The second recitation is designed to demonstrate that the required public hearing has been held, while the third recitation sets forth a statement that the corporate authorities have complied with the requirement that they receive all protests, objections, and information concerning the proposed zone. The fourth recitation is designed to demonstrate that the number of written protests which were received are, percentage-wise, less than the numbers which would prevent the municipality from establishing the zone. The fifth recitation serves a similar prupose to the preceding recitation in that even after the conclusion of the hearing, the proceedings may, nevertheless, be aborted if a petition signed by 51 percent of the electors residing within this proposed zone and 51 percent of the owners of record of the land included within the boundaries of the zone file petitions objecting to the establishment of the zone within 60 days after the public hearing. Because of this requirement, it may be advisable to delay the enactment of the ordinance establishing the zone until after 60 days have elapsed from the public hearing. The last recitation simply sets forth a general statement of public

purpose in creating the zone.

Article 1. Establishment of Zone

This section provides for the establishment of the zone as set forth in the previous ordinance declaring intention to form a zone.

Article 2. Construction, Operation, and Maintenance

The ordinance of intent described the responsibilities for operation and maintenance and the proposed method for financing the system. This article authorizes those powers and duties (Section 1), provides for adoption of reasonable rules and regulations (Section 2), and authorizes levying taxes and user charges to finance the wastewater system (Section 3).

Article 3. Subsequent Ordinances

If construction grant funding is used to help finance the project, subsequent ordinances are required to implement a user charge system and to regulate use of the sewers. If no construction grant funds are involved, the subsequent ordinances are not mandatory. Nevertheless, if the system is to be properly operated and maintained, some type of sewer use ordinance similar to the model ordinance in Appendix E-2 of this report should be adopted.

Article 4. Validity, and
Article 5. Ordinance in Force

These are standard provisions in any ordinance and should be modified as necessary to be consistent with the wording and format normally used by each municipality.

MODEL ORDINANCE

Ordinance Number ___

An ordinance declaring the intention to form an on-site wastewater disposal zone to implement wastewater collection and disposal systems which include components located on private property in the

_____ of _____, County of
(City, Village, etc.) (Name of Town)

_____, State of Illinois.

WHEREAS, the treatment and disposal of sewage generated within certain ares of this Municipality would be most efficiently accomplished through the use of an on-site wastewater disposal system; and

WHEREAS, an on-site wastewater disposal system can be more properly constructed, operated, maintained, and financed through the creation of a Municipal Wastewater Disposal Zone in the manner provided by Chapter 24, Section 1401, et seq. of the Illinois Rvised Statutes;

NOW, THEREFORE, be it ordained by the _____
(President and Board

_____ of the _____ of
of Trustees, City Council, etc.) (City, Village, etc.)

_____ as follows:
(Name of Town)

Article 1. Definitions

Unless the context specifically indicates otherwise, the meaning of terms used in this ordinance shall be as provided in this Article.

Section 1. "On-Site Wastewater System" means any facilities, devices, or other components used to collect, treat, or dispose of wastewater on or immediately adjacent to the property from which the wastewater is generated.

Section 2. "Zone" means an on-site wastewater disposal zone formed in accordance with Illinois Revised Statues, Chapter 24, Sections 1401 through 1422.

Section 3. "_____" means the incorporated
(City, Village, etc.)

municipality of the _____ of
(City, Village, etc.)

_____.
(Name of Town)

Section 4. "Wastewater" means used water including sewage, commercial or industrial waste, or any combination of these whether treated or not, plus any admixed groundwater or surface water runoff.

Section 5. "Proposed Plan for Wastewater Disposal" means the complete system for wastewater collection, treatment, and disposal including both on-site wastewater systems and off-site publically-owned facilities (if any) used for treatment and disposal of wastewater.

Article 2. Boundaries

Section 1. The proposed boundaries of the zone are hereby established as shown on the accompanying map designated "Wastewater Disposal Zone Map," which is hereby made a part of this Ordinance.

Section 2. The boundary lines shown on the map are intended to follow either streets, alleys, or lot lines; and said streets, alleys, or lot lines shall be construed to be the boundary of the zone unless the boundary is otherwise indicated on the map.

Article 3. Public Benefit

Section 1. Formation of the zone will benefit the public by:

allowing for the proper collection, treatment, and disposal of wastewater,

protecting the public health,

preventing and abating nuisances,

promoting environmental quality,

allowing application for federal and/or state grant funds for on-site wastewater systems, and

achieving compliance with regulations of the State of Illinois regarding public health or environmental protection.

Article 4. Wastewater Disposal System

Section 1. The proposed on-site wastewater systems include _____ (septic tanks, aerobic units, etc.) for the pretreatment of wastewater, _____ (pressure sewers, gravity sewers, etc. for the transport of pretreatment wastewater and (if applicable) _____ (filters, chlorination facilities, seepage fields, etc.) for the final treatment and disposal of wastewater.

Section 2. The proposed plan for the wastewater disposal is set forth in the _____ (Facilities Plan, Plan of Wastewater _____ Improvements, etc.) for the _____ (City, Village, etc.) of _____ (Name of Town), dated _____ and is summarized as follows:

(a) Existing _____ (septic tanks, aerobic units, etc.) receiving wastewater from buildings in the zone will be inspected and, if found to be acceptable, utilized or if found to be unacceptable, repaired or replaced as necessary.

(b) A system of _____ (gravity sewers, pumps, pressure sewers, _____ etc.) will be constructed to properly convey the pretreated wastewater discharged from said _____ (septic tanks, aerobic units, etc.) for further treatment.

(c) A system of treatment facilities including

_____
(flow distribution structures, lagoons, filters,

_____ will be constructed to properly
pumps, etc.)

treat and discharge the pretreated wastewater.

(d) The _____ will be responsible for
(Village, City, etc.)

operation and maintenance of publicly-owned and on-site wastewater system facilities as further described in Article 5 of this Ordinance.

(e) The _____ will not be responsible
(Village, City, etc.)

for installation, operation, maintenance, or replacement of wastewater generating fixtures within buildings nor for the conveyance pipes from such fixtures to the _____
(septic tank, aerobic unit, etc.)

The _____ may adopt and enforce such
(Village, City, etc.)

reasonable rules and regulations regarding such fixtures and conveyance pipes as are necessary to protect the on-site wastewater systems and publicly-owned wastewater collection and tratment facilities and to implement the purposes of the zone.

Section 3. In the proposed zone, the number of residential units to be served is approximately ____, and the number of commercial and other non-residential users to be served is approximately ____.

Article 5. Inspections, Operation, and Maintenance

Section 1. The _____ will be responsible for
(Village, City, etc.)

operation, maintenance, and replacement of all publicly-owned wastewater collection and treatment facilities in accordance with established practices and all applicable regulations of the State of Illinois. The _____ will employ or contract
(Village, City, etc.)

for the services of a properly certified wastewater treatment plant operator.

Section 2. After connection of on-site facilities to the

publicly-owned facilities, the _____
(Village, City, etc.)

will be responsible for operation, maintenance, and replacement of on-site wastewater systems as enumerated in Article 4, Section 1, within the zone. Said responsibility will include rights of access for the purposes of inspection, maintenance, and system replacement as follows:

(a) After formation of the zone, an authorized representative of the _____
(Village, City, etc.)

upon presentation of his credentials shall have the authority to enter at all reasonable times any premises upon which on-site wastewater system facilities are located for the purpose of inspection, rehabilitation, or maintenance of said facilities including collection of samples of discharges therefrom or any records required to be maintained by federal, state, or local law or regulation.

(b) The _____ shall have the
(Village, City, etc.)

authority to modify any on-site wastewater system if necessary in order to provide reasonable access to that system for inspection and maintenance purposes.

(c) The _____ will establish a program for routine inspection of all on-site wastewater systems not less than once every three years. The inspections will be performed by a duly authorized representative of the _____.
(Village, City, etc.)

Not less than 30 days prior to the date of a routine inspection or maintenance service, the

_____ shall notify the
(Village, City, etc.)

property owner and resident of the property that the inspection or maintenance will occur.

(d) In the event that any on-site wastewater system develops a problem or defect which requires corrective work prior to the next routine inspection,

the _____ shall notify
(Village, City, etc.)

the owner and resident of the affected property not less than 60 days prior to the date of such work, said notice to include the following:

1. A description of the deficiency which requires corrective work;

2. A description of the entire work to be performed;

3. An estimate of the number of days required to complete the work; and

4. The scheduled date for beginning the work.

(e) In the event of an emergency condition which creates an immediate danger to public health or safety, the

_____ shall be authorized to
(Village, City, etc.)

enter the premises upon which on-site wastewater facilities are located and to perform all reasonable corrective actions necessary to remedy the emergency condition.

Section 3. If as a result of any inspections it is determined that repairs, replacement, or cleaning of any on-site wastewater system components is required, said services will be performed by _____ employees
(Village, City, etc.)

or by a private contractor retained by the

_____ and duly licensed in accordance with the provisions of the "Private Sewage Disposal Licensing Act" approved September 12, 1973, as amended, as well as other applicable laws and regulations. The servicing, cleaning, hauling, and disposal of any wastes from on-site wastewater systems shall be performed in accordance with the Private Sewage Disposal Code adopted by the Illinois Department of Public Health.

Section 4. The _____ shall prepare and
(Village, City, etc.)

retain for public inspection records of all inspections, maintenance, and sludge dipsosal and any other work performed on on-site wastewater systems within the zone.

Article 6. Method of Financing Operations and Construction

Section 1. The proposed method of financing the operation, maintenance, and replacement costs of the wastewater systems within the zone is by a system of user charges based on actual use or estimated use of wastewater collection, treatment, and disposal services. The user charge system shall provide sufficient revenue to pay the costs of operation, maintenance, and replacement of the on-site and publicly-owned wastewater facilities and (include following only if applicable) the costs of debt service on revenue bonds which may be issued by the

_____ to finance the local share of
(Village, City, etc.)

project capital costs.

Section 2. The proposed method of financing the local share of project capital costs is by (include one of the following or whatever is appropriate) issuance of revenue bonds by the _____ which bonds shall be
(Village, City, etc.)

repaid by the user charge system

(or)

issuance of general obligation bonds by the

_____ which bonds shall be
(Village, City, etc.)

repaid by the levying of taxes against the property included in the zone.

Issuance of bonds shall be provided for in a separate ordinance and shall be subject to the public notificaton requirements of Illinois Revised Statutes Chapter 24, Paragraph 1406, and other appliable state or local laws, ordinances, and regulations.

Article 7. Public Hearing

Section 1. A public hearing on the question of formation and extent of the proposed zone and on the number and type of residential and commercial users that are to be served in

the proposed zone shall be held at _____
(time of day)

on _____ at the _____.
(date) (City Hall, etc.)

Section 2. Notice of the aforesaid hearing shall be given by publication of this ordinance in a newspaper of general circulation circulated within this Municipality no later than ten (10) days prior to the date hereinabove established, or if no newspaper meeting this requirement exists, the notice shall be published in a newspaper of general circulation within this County.

Section 3. At the time and place of the hearing or at any time or place to which the hearing is adjourned, any interested owner of real property may appear and present any matters material to the questions set forth herein. At the hearing, the _____
(City Council, Village Board, etc.)

of this Municipality shall hear and receive any oral or written protests, objections, or information which shall be made, presented, or filed. Any person who shall have filed a written protest may withdraw the same at any time prior to the conclusion of the hearing.

Article 8. Validity

Section 1. If any section, paragraph, clause, or provision of this Ordinance shall be held to be invalid or unenforceable for any reason, the invalidity or unenforceability of such provision shall not affect any of the remaining provisions of this Ordinance.

Article 9. Ordinance in Force

Section 1. This Ordinance shall be in full force and effect from and after its passage and approval and publication as provided by law. Passed by the _____
(City Council, Board of Trustees,

_____ of the _____ of
etc.) (City, Village, etc.)

_____ on the ___ day of
(Name of Town)

_____, _____.
(month) (year)

Approved:

_____

(Mayor, Village President, etc.)

(Municipal Seal)

Attest:

_____

(Clerk, Secretary, etc.)

MODEL ORDINANCE

Ordinance Number ___

An ordinance establishing a municipal wastewater disposal zone in the

_____ of _____, County of
(City, Village, etc.) (Name of Town)

_____, State of Illinois.
(Name of County)

WHEREAS, pursuant to Ordinance No. ___ of this Municipality adopted on

_____, the _____
(Date of Adoption) (City Council, Board of Trustees, etc.)

of this Municipality heretofore declared its intention to form a Municipal Wastewater Disposal Zone in accordance with the provisions of Illinois Revised Statutes, Chapter 24, Section 1401, et seq. (hereinafter referred to as the "Act"); and

WHEREAS, in accordance with the provisions of the aforesaid Ordinance and in accordance with the provisions of the Act, a public hearing on the question of the formation of the proposed Municipal Wastewater Disposal Zone was held on _____ __.m.
(Time of Hearing)

on _____ at _____; and
(Date of Hearing) (Location of Hearing)

WHEREAS, at the aforesaid hearing the _____
(City Council, Board of

_____ heard and received all oral and written protests,
Trustees, etc.)

objections, or information which were made, presented, or filed at that time; and

WHEREAS, at the conclusion of the aforesaid hearing, the number of written protests filed or not withdrawn were less than 51 percent of the number of voters who reside within the Zone as hereinafter described and were also less than 51 percent of the number of owners of real property in the proposed Zone who also own at least 51 percent of the assessed value of the real property within the proposed Zone; and

WHEREAS, no petition objecting to the creation of the Zone was received within sixty (60) days following the final adjournment of the public hearing; and

WHEREAS, the creation of the Municipal Wastewater Disposal Zone hereinafter described will promote the health, safety, and welfare of the residents of this Municipality;

NOW, THEREFORE, be it ordained by the _____ (City Council, President, and _____ of the Board of Trustees, etc.) _____ of the (City, Village, etc.) _____ that:

Article 1. Establishment of the Zone

Section 1. A Municipal Wastewater Disposal Zone (hereinafter referred to as the "Zone") is hereby formed, created, and established as described and set forth in Ordinance No. ___, an ordinance declaring the intention to form an on-site wastewater disposal zone.

Article 2. Construction, Operation, and Maintenance

Section 1. In providing for the operation of the Zone, the _____ (City Council, Board of Trustees, etc.) of this Municipality may exercise all rights, power and authority granted under the provisions of the Act as it now exists or may be hereafter amended.

Section 2. Without limiting the generality of Section 1 of this Article 2, the _____ (City Council, Board of Trustees, etc.) may adopt and enforce reasonable rules and regulations necessary to the proper and efficient operation of the Zone. Such rules and regulations shall be adopted in the manner provided by the Act as it now exists or may from time to time be amended.

Section 3. In order to finance the cost of capital improvements, operations, and maintenance, the _____ (City Council, Board of Trustess, etc.) may impose taxes and user charges to the extent of and in the manner provided in the Act as it now exists or may from time to time be amended.

Article 3. Subsequent Ordinances

Section 1. Prior to construction of any wastewater facilities as described in Article 4 of Ordinance No. ___ (ordinance declaring intent to form a zone), the

_____ shall adopt a
(City Countil, Board of Trustees, etc.)

shall adopt a user charge system which complies with regulations of the United States Environmental Protection Agency at 40 CFR 35.2140 and other applicable laws and regulations.

Section 2. Prior to completion of construction of the wastewater facilities described in Article 4 of Ordinance No. ___,

the _____ shall
(City Council, Board of Trustees, etc.)

adopt a sewer use ordinance which complies with regulations of the United States Environmental Protection Agency at 40 CFR 35.2130 and other applicable laws and regulations.

Article 4. Validity

Section 1. If any section, paragraph, clause, or provision of this Ordinance shall be held to be invalid or unenforceable for any reason, the invalidity or unenforceability of such provision shall not affect any of the remaining provisions of this Ordinance.

Article 5. Ordinance in Force

Section 1. This Ordinance shall be in full force and effect from and after its passage and approval and publication as provided

by law. Passed by the _____
(City Council, Board of

_____ of the _____ of
Trustees, etc.) (City, Village etc.)

_____ on the ___ day of
(Name of Town)

_____, _____.
(Month) (Year)

Approved:

_____
(Mayor, Village President, etc.)

(Municipal Seal)

Attest:

_____
(Clerk, Secretary, etc.)

APPENDIX E-2

MODEL ORDINANCE REGULATING USE OF PUBLIC SEWERS AND ON-SITE WASTEWATER SYSTEMS

As with conventional systems, a sewer use ordinance is also required for cluster systems to assure that discharges into the public system are controlled and that facilities are properly designed and installed.

In most cases, a municipal disposal zone will be formed to manage cluster systems which are under public jurisdiction. For this reason, the model ordinance regulating sewer use has been written to be used in conjunction with a municipal disposal zone ordinance. If a sanitary district, water district, or other public authority has been established to manage the cluster system, then several sections would require revisions. Nevertheless, the major provisions of the model ordinance should remain.

The model ordinance has been patterned after that suggested by the Illinois Environmental Protection Agency (IEPA) for conventional systems, with substantial changes to incorporate provisions for on-site wastewater systems under public jurisdiction. The ordinance has been structured for a system which includes the following:

(1) Some residential, commercial, or industrial facilities connected directly to a public sewer (as in a conventional system);

(2) Some residential, commercial, or industrial facilities served by publicly maintained on-site wastewater systems discharging either into a public sewer or natural watercourse or with subsurface disposal.

(3) Some residential, commercial, or industrial facilities served by private sewage disposal systems.

In many communities using cluster systems, one or more of the above categories may not exist. In those situations, certain provisions in the ordinance could be simplified or deleted entirely. Even if no existing industrial facilities are present, it may be advisable to include those provisions to provide a control mechanism for any future industrial facilities. In general, the suggested ordinance should not be used directly with only the blanks filled in. Rather, each article and section should be reviewed with respect to the particular cluster system planned and the needs of the local community.

When a proposed ordinance has been drafted to the satisfaction of the corporation counsel, engineering consultant, and other local authorities, it should be submitted to the Illinois Environmental Protection Agency (IEPA), Illinois Department of Public Health, or other appropriate regulatory agency for their review prior to enactment. This should reveal any possible conflicts with state and federal requirements.

To assist in using and interpreting the model ordinance, the following paragraphs explain the purpose and some of the more important considerations for each section in the model ordinance.

Article 1. Definitions

A well written ordinance should include definitions of all technical terms, shortened phrases, and other terms which may have more than one interpretation. The model ordinance includes most of the important definitions; others may be desirable in certain situations.

This article typically appears at the beginning of the ordinance, but some municipalities may prefer to place definitions at the end of the ordinance to be consistent with past practice.

Article 2. Use of Public Sewer Required

The purpose of this article is to prohibit improper disposal of wastewater and to require use of public wastewater systems where such systems have been constructed to serve the properties being developed.

Article 3. On-Site Wastewater Systems

This article includes provisions for permits, inspections, and responsibilities for operation, maintenance, and replacement. Section 6 provides for a private sewage disposal system for properties which are outside the municipal disposal zone.

Article 4. Building Sewers and Connections

Since cluster systems will normally have at least a short building sewer between the building and on-site wastewater components, most provisions related to building sewers are still valid. The permit requirement in Section 3 has been revised so that building sewer permits and on-site wastewater system permits are not both required.

Article 5. Use of the Public Sewer and On-Site Wastewater Systems

Sections 1 and 2 prohibiting stormwater and other discharges are equally valid for cluster systems as for conventional systems. Likewise, the restrictions on types of wastes which may be discharged are generally applicable to clusters. The approval of garbage grinders has been strengthened to prevent the addition of garbage grinders after an on-site system has been approved on the basis of no garbage grinder. A more conservative, fool-proof approach would be to require <u>all</u> on-site systems to meet the requirements for garbage grinders. This approach would eliminate the possibility of "cheaters" and also reduce the maintenance requirements for properties which never install grinders.

Article 6. Protection of Sewage Works from Damage

This article has been modified to include on-site systems under public jurisdiction.

Article 7. Powers and Authorities of Inspectors

General rights of inspection, including inspection of on-site systems on private properties within a disposal zone are provided by this article. More specific information such as notification requirements, frequency of inspection, etc., have not been repeated here since they were included in the suggested ordinance for municipal disposal zones. In some cases, it may be preferable to include those specifics in this ordinance instead or in both places.

Article 8. Penalties

This article is essential to provide a mechanism for enforcing the ordinance. The suggested format is a general one which could apply to nearly any ordinance. If particular violations are expected to occur more frequently, these could be listed separately and the notification step deleted to discourage violations.

Article 9. Validity

Article 10. Ordinance in Force

These are standard provisions of any ordinance and should be modified as necessary to be consistent with the wording and format normally used by each municipality.

MODEL ORDINANCE

Ordinance No. ___

An ordinance regulating the use of public and private sewers and drains, private sewage disposal, the installation and connection of building sewers, the discharge of waters and wastes into the public sewer system, and providing penalties for violations thereof,

in the _____ of _____.
(City Village, etc.) (Name of Town)

County of _____, State of Illinois.

NOW THEREFORE, be it ordained by the _____
(City Council, President,

_____ of the _____ of
and Board of Trustees, etc.) (City, Village, etc.)

_____, that:
(Name of Town)

Article 1. Definitions

Unless the context specifically indicates otherwise, the meaning of terms used in this ordinance shall be as follows:

Section 1. Local Government:

"Ordinance" means this ordinance.

"_____" means the
(City, Village, etc.)

_____ of _____.
(City, Village, etc.) (Name of Town)

"Approving Authority" means the _____
(Superintendent,

_____ of the _____
Chairman, etc.) (Dept. of Public Works, Water

_____.
& Sewer Commission, etc.)

"Wastewater Plan" means the Facilities Plan, Plan of Improvements, or other officially designated plan for wastewater collection, treatment, and disposal which has been approved by the _____
(Unit of Government)

"Municipal Disposal Zone" means the zone formed by the

_____ under Ordinance No. ___.
(Unit of Government)

Section 2. "Person" shall mean any and all persons, natural or artificial, including but not limited to any individual, firm, company, municipal, or private corporation, association, society, institution, enterprise, governmental agency, or other entity.

Section 3. Clarification of word usage: "Shall" is mandatory; "may" is permissable.

Section 4. Wastewater and its characteristics:

"Wastewater" shall mean the spent of water of a community. From this standpoint of course, it may be a combination of the liquid and water-carried wastes from residences, commercial buildings, industrial plants, and institutions, together with any groundwater, surface water, and stormwater that may be present.

"Pretreated Wastewater" shall mean wastewater which has been partially treated by grinder pumps, septic tanks, aerboic units, or other treatment devices, and facilities located on private property.

"Sewage" is used interchangeably with "wastewater."

"Milligrams per Liter" shall mean a unit of the concentration of water or wastewater constituent. It is 0.001 g of the constituent of 1,000 ml of water. It has replaced the unit formerly used commonly, parts per million, to which it is approximately equivalent, in reporting the results of water and wastewater analysis.

"Suspended Solids" (SS) shall mean solids that either float on the surface of, or are in suspension in water, sewage, or industrial waste, and which are removable by a laboratory filtration device. Quantitative determination of suspended solids shall be made in accordance with procedures set forth in the current edition of Standard Methods for the Examination of Water and Wastewater.

"BOD" (denoting Biochemical Oxygen Demand) shall mean the quantity of oxygen utilized in the biochemical oxidation of organic matter under standards laboratory procedure in five (5) days at 20°C, expressed in milligrams per liter.

"pH" shall mean the logarithm (base 10) of the reciprocal of the hydrogen-ion concentration expressed by one of the procedures outlined in the current edition of Standard Methods for the Examination of Water and Wastewater.

"Garbage" shall mean solid wastes from the domestic and commercial prepration, cooking, and dispensing of food, and from the handling, storage, and sale of food.

"Properly Shredded Garbage" shall mean the wastes from the preparation, cooking, and dispensing of food that have been shredded to such a degree that all particles will be carried freely under the flow conditions normally prevailing in public sewers, with no particle greater than one-half (1/2) inch (1.27 centimeters) in any dimension.

"Floatable Oil" is oil, fat, or grease in a physical state such that it will separate by gravity from wastewater by treatment in an approved pretreatment facility. A wastewater shall be considered free of floatable fat if it is properly pretreated and the wastewater does not interfere with the collection system.

"Slug" shall mean any discharge of water, sewage, or industrial waste in which concentration of any given constituent or in quantity of low exceeds for any period of duration longer than fifteen (15) minutes more than five (5) times the average twenty-four (24) hour concentration or flows during normal operation.

"Industrial Waste" shall mean any solid, liquid, or gaseous substance disharged, permitted to flow, or escaping from any industrial, manufacturing, commercial, or business establishment or process or from the development, recovery, or processing of any natural resource as distinct from sanitary sewage.

Section 8. Sewer Types and Appurtenances:

"Sewer" shall mean a pipe or conduit for conveying sewage or any other waste liquids, including storm, surface, and groundwater drainage.

"Public Sewer" shall mean a sewer provided by or subject to the jurisdiction of the _____.
(City, Village, etc.)

It shall also include sewers within or outside the

_____ boundaries that serve one
(City, Village, etc.)

or more persons and ultimately discharge into the

_____ sanitary (or combined)
(City, Village, etc.)

sewer system, even though those sewers may not have been

constructed with _____ funds.
(City, Village, etc.)

"Sanitary Sewer" shall mean a sewer that conveys sewage or industrial wastes or a combination of both, and into which storm, surface, and groundwaters or polluted industrial wastes are not intentionally admitted.

"Storm Sewer" shall mean a sewer that carries storm, surface, and groundwater drainage, but excludes sewage and industrial wastes other than unpolluted cooling water.

"Combined Sewer" shall mean a sewer which is designed and intended to receive wastewater, storm, surface, and groundwater drainage.

"Building Sewer" shall mean the extension from the building drain to the public sewer, on-site wastewater system, or other place of disposal.

"Building Drain" shall mean that part of the lowest piping of a drainage system which receives discharge from soil, waste, and other drainage pipes inside the walls of the building and conveys it to the building sewer or other approved point of discharge, beginning five (5) feet (1.5 meters) outside the inner face of the building wall.

"Stormwater Runoff" shall mean the portion of the precipitation that is drained into the sewers.

"Sewerage" shall mean the system of sewers and appurtenances for the collection, transportation, and pumping of sewage.

"Easement" shall mean acquired legal right for the specific use of land owned by others.

Section 9. Treatment:

"Pretreatment" shall mean the treatment of wastewaters from sources before introduction into the wastewater treatment works or public sewer.

"Wastewater Treatment Works" shall mean an arrangement of devices and structures for treating wastewater, industrial wastes, and sludge. Sometimes used as synonymous with "waste treatment plant" or "wastewater treatment plant" or "pollution control plant."

Section 10. Wastewater Systems:

"Wastewater Facilities" shall mean the structures, equipment, and processes required to collect, carry away, and treat domestic and industrial wastes and transport effluent to a watercourse.

"On-Site Wastewater System" shall mean any facilities, devices, or other components used to collect, treat, or dispose of wastewater on, or immediately adjacent to, the property from which the wastewater is generated.

"Private Sewage Disposal System" shall mean any on-site wastewater system which is used for final wastewater disposal or discharge to a natural outlet and which is

not under the responsibility of the _____ (Unit of

_____ Government).

Section 11. Watercourse and connections:

"Watercourse" shall mean a channel in which flow of water occurs, either continuously or intermittently.

"Natural Outlet" shall mean any outlet into a watercourse, pond, ditch, lake, or other body of surface or groundwater.

Article 2. Use of Public Sewers Required

Section 1. It shall be unlawful for any person to place, deposit, or permit to be deposited in any unsanitary manner on public or private property within the _____ (Unit of Government) of _____ or in any area under the jurisdiction of said _____ (Unit of Government), any human or animal excrement, garbage, or objectionable waste.

Section 2. It shall be unlawful to discharge to any natural outlet within the _____ (Unit of Government) of _____, or in any area under the jurisdiction of said _____ (Unit of Government), any sewage or other polluted waters, except where suitable treatment has been provided in accordance with subsequent provisions of this ordinance.

Section 3. Except as provided in Article 3, it shall be unlawful to construct or maintain any privy, privy vault, septic tank, cesspool, or other facility intended or used for the private disposal of sewage.

Section 4. The owner of all houses, buildings, or properties used for human occupancy, employment, recreation, or other purposes situated within the _____ (Unit of Government) and abutting on any street, alley, right-of-way, or easement in which there is now loated or may in the future be located any public sanitary (or combined) sewer of the _____ (Unit of Government), is hereby required at his expense to install suitable toilet facilities therein, and to connect such facilities directly with the proper public sewer or indirectly with public sewer when on-site wastewater systems are required in accordance

with the provisions of this ordinance, within ninety (90) days after date of official notice to do so, provided that connection to said public sewer is consistent with the wastewater plan of the _____.
(Unit of Government)

Article 3. On-Site Wastewater Systems

Section 1. Wherever the wastewater plan requires on-site wastewater systems either for the pretreatment of wastewater prior to discharge to the public sewer or for the complete treatment and disposal of wastewater in lieu of connection to the public sewer, then the owner of any house, building, or other property from which wastewater is generated must construct, at his own expense, an on-site wastewater system in accordance with the provisions of this Article 3.

Section 2. Before commencement of construction of any on-site wastewater system, the owner shall consult with the

_____ to determine the general
(Approving Authority)

requirements for the on-site system and shall obtain a

written permit signed by the _____.
(Approving Authority)

The application for such permit shall be made on a form

furnished by the _____,
(Unit of Government)

(reference Appendix 1) which the applicant shall supplement by any plans, specifications, and other information as deemed necessary by the

_____. A permit and
(Approving Authority)

inspection fee of _____ dollars shall be paid to the

_____ at the time the application
(Unit of Government)

is filed.

Section 3. A permit for an on-site wastewater system shall not become effective until the installation is completed to

the satisfaction of the _____.
(Approving Authority)

The _____ shall be allowed
(Approving Authority)

to inspect the work at any stage of construction, and, in any event, the applicant for the permit shall notify the

_____ when the work is ready
(Approving Authority)

for final inspection, and before any underground portions are covered. The inspection shall be made within ____ hours of the receipt of written notice by

the _____.
(Approving Authority)

Section 4. The type, capacities, location, and layout of an on-site wastewater system shall comply with all recommendations of the State of Illinois Private Sewage Disposal Licensing Act and Code, the State of Illinois Environmental Protection Agency, and the

_____. No permit shall be
(Unit of Government)

issued for any on-site wastewater system employing subsurface soil absorption facilities or any other final disposal method excpet where such on-site disposal is in accordance with the wastewater plan.

Section 5. If the on-site wastewater system lies within the Municipal Disposal Zone, then upon satisfactory completion of construction of on-site wastewater system as determined by final inspection by the

_____
(Approving Authority)

the _____ shall assume full
(Unit of Government)

responsibility for the operation, maintenance, and replacement of said system in accordance with the provisions of Ordinance No. ___ (the ordinance to form a municipal disposal zone). The responsibility of the

_____ does not include the
(Unit of Government)

building drain or building sewer leading from the

building to the _____.
(pretreatment unit)

Section 6. If the on-site wastewater system does not lie within the Municipal Disposal Zone, then the property owner shall retain full responsibility for the operation, maintenance, and replacement of said system which shall be a private sewage disposal system.

The owner shall operate and maintain the private sewage disposal system in a sanitary manner at all times, and at no expense to the _____ (Unit of Government).

Section 7. No statement contained in this Article shall be construed to interfere with any additional requirements that may be imposed by the _____ (Local Health Officer).

Article 4. Building Sewers and Connections

Section 1. No unauthorized person shall uncover, make any connections with, or opening into; use; alter; or disturb any public sewer or appurtenance thereof without first obtaining a written permit from the _____ (Approving Authority).

Section 2. All disposal by any person into the sewer system is unlawful except those discharges in compliance with all federal standards promulaged pursuant to the Federal Water Pollution Control Act as amended and more stringent state and local standards.

Section 3. If a building sewer is connected directly to a public sewer, then a building sewer permit shall be required in accordance with the provisions of this Article 4. If a building sewer is connected to an on-site wastewater system, then a building sewer permit shall not be required.

Section 6. A separate and independent building sewer shall be provided for every building, except that where one building stands at the rear of another on an interior lot and no private sewer is available or can be constructed to the rear building through an adjoining alley, court, yard, or driveway, the building sewer from the front building may be extended to the rear building and the whole considered as one building sewer.

Section 7. Old building sewers may be used in connection with new buildings only when they are found, on examination and test by the _____, to meet all
(Approving Authority)

requirements of this ordinance.

Section 8. The size, slope, alignment, materials of construction of a building sewer, and the methods to be used in excavating, placing of the pipe, jointing, testing, and backfilling the trench, shall all conform to the requirements of the building and plumbing code or other applicable rules and regulations of the _____. In the absence of code
(Unit of Government)

provisions or in amplification thereof, the materials and proedures set forth in appropriate specifications of the American Society of Testing Materials, Water Pollution Control Federation Manual of Practice No. 9, and Standard Specifications for Water and Sewer Main Construction in Illinois shall apply.

Section 9. Whenever possible, the building sewer shall be brought to the building at an elevation below the basement floor. In all buildings in which any building drain is too low to permit gravity flow to the public sewer, sanitary sewage carried by such building drain shall be lifted by means which is approved in accordance with Article 4, Section 3, and discharged to the building sewer.

Section 10. No person(s) shall make connections of roof downspouts, exterior foundation drains, areaway drains, or other sources of surface runoff or groundwater to a building sewer or building drain which in turn is connected directly or indirectly to a public sanitary sewer or on-site wastewater system.

Section 11. The connection of the building sewer into the public sewer or on-site wastewater system shall conform to the requirements of the building and plumbing code, other applicable rules and regulations of the

_____, or the procedures set forth
(Unit of Government)

in appropriate specifications of the American Society of Testing Materials, Water Pollution Control Federation Manual of Practice No. 9, and Standard Specifications for

Water and Sewer Main Construction in Illinois. All such connections shall be made gastight and watertight. Any deviation from the prescribed procedures and materials must be approved by the _____ before
(Approving Authority)

installation.

Section 12. The applicant for the building sewer permit shall notify the _____ when the building sewer
(Approving Authority)

is ready for inspection and connection to the public sewer. The connection shall be made under the

supervision of the _____
(Approving Authority)

or his representative.

Section 13. All excavations for building sewer installation shall be adequately guarded with barricades and lights so as to protect the public from hazard. Streets, sidewalks, parkways, and other public property disturbed in the course of the work shall be restored in a manner

satisfactory to the _____.
(Unit of Government)

Article 5. Use of Public Sewers and On-Site Wastewater Systems

Section 1. No person shall discharge or cause to discharged any stormwater, surface water, groundwater, roof runoff, subsurface drainage, uncontaminated cooling water, or unpolluted industrial process waters to any sanitary sewer or on-site wastewater system.

Section 2. Stormwater and all other unpolluted drainage shall be discharged to such sewers as are specifically designated as combined sewers or storm sewers, or to a natural

outlet approved by the _____.
(Approving Authority)

Industrial cooling water or unpolluted process waters may be discharged on approval of the _____
(Approving Authority)

to a storm sewer, combined sewer, or natural outlet.

Section 3. No person shall discharge or cause to be discharged any of the following described waters or wastes to any public sewers or on-site wastewater systems:

(a) Any gasoline, benzene, naphtha, fuel oil, or other flammable or explosive liquid, solid, or gas.

(b) Any waters or wastes containing toxic or poisonous solids, liquids, or gases in sufficient quantity, either singly or by interaction with other wastes, to injure or interfere with any sewage treatment process, constitute a hazard to humans or animals, create a public nuisance, or create any hazard in the receiving waters of the treatment sewage discharge.

(c) Any waters or wastes having a pH lower than 5.5 or having any other corrosive property capable of causing damage or hazard to structures, equipment, and personnel of the sewage works.

(d) Solid or viscous substances in quantities or of such size capable of causing obstruction to the flow in sewers, or other interference with the proper operation of the sewage works such as, but not limited to, ashes, cinders, sand, mud, straw, oil, grease, shavings, metal, glass, rags, feathers, tar, plastics, wood, unground garbage, whole blood, paunch manure, hair and fleshings, entrails, paper dishes, cups, milk containers, etc., either whole or ground by garbage grinders.

Section 4. No person shall disharge or cause to be discharged the following described substances, materials, waters, or wastes if it appears likely in the opinion of the

_____ that such wastes can harm
(Approving Authority)

either the sewers, sewage treatment process or equipment; have an adverse effect on the receiving stream; or can otherwise endanger life, limb, public property, or constitute a nuisance. In forming his opinion as to the

acceptability of these wastes, the _____
(Approving Authority)

will give consideration to such factors as the quantities

of subject wastes in relation to flows and velocities in the sewers, materials of construction of the sewers, nature of the sewage treatment process, capacity of the sewage treatment plant, degree of treatability of wastes in the sewage treatment plant or on-site system, and maximum limits established by regulatory agencies. The substances prohibited are:

(a) Any liquid or vapor having a temperature higher than one hundred fifty degrees Fahrenheit (150°F), (65°C).

(b) Any waters or wastes containing toxic or poisonous materials; or oils, whether emulsified or not, in excess of one hundred (100) mg/l or containing substances which may solidify or become viscous at temperatures between thirty-two (32) and one hundred fifty degrees Fahrenheit (150°F), (0 and 65°C).

(c) Any garbage that has not been properly shredded. The installation and operation of any garbage grinder equipped with a motor of three-fourths (3/4) horsepower (0.76 hp metric) or greater shall be subject to the review and approval of the

_____. The installation
(Approving Authority)

and operation of any smaller garbage grinder shall also be subject to the review and approval of the

_____ if such garbage grinder
(Approving Authority)

discharges directly or indirectly into an on-site wastewater system except that any garbage grinder installation previously approved under Article 3, Section 2, shall not require an additional approval.

(d) Any waters or wastes containing strong acid, iron pickling wastes, or concentrated plating solution whether neutralized or not.

(e) Any waters or wastes containing iron, chromium, copper, zinc, or similar objectionable or toxic substances; or wastes exerting an excessive chlorine requirement, to such degree that exceeds the limits

established by the _____
(Approving Authority)

for such materials.

(f) Any waters or wastes containing phenols or other taste or odor-producing substances, in such concentrations exceeding limits which may be established by the _____ (Approving Authority)

as necessary after treatment of the composite sewage, to meet the requirements of the State, Federal, or other public agencies of jurisdiction for such discharge to the receiving waters.

(g) Any radioactive wastes or isotopes of such half-life or concentration as may exceed limits established by the _____ (Approving Authority) in compliance

with applicable State or Federal regulations.

(h) Any wastes or waters having a pH in excess of 9.5.

(i) Any mercury or any of its compounds in excess of 0.0005 mg/l as Hg at any time except as permitted by

the _____ (Approving Authority) in compliane

with applicable State and Federal regulations.

(j) Any cyanide in excess of _____mg/l at any time

except as permitted by the _____ (Approving Authority)

in compliance with applicable State and Federal regulations.

(k) Materials which exert or cause:

(1) unusual concentrations of inert suspended solids (such as, but not limited to, Fullers earth, lime slurries, and lime residues) or of dissolved solids (such as, but not limited to, sodium chloride and soldium sulfate);

(2) excessive discoloration (such as, but not limited to, dye wastes and vegetable tanning solutions);

(3) unusual BOD, chemical oxygen demand, or chlorine requirements in such quantities as to constitute a significant load on the sewage treatment works;

(4) unusual volume of flow or concentrations of wastes constituing "slugs" as defined herein.

(l) Waters or wastes containing substances which are not amenable to treatment or reduction by the sewage treatment processes employed, or are amenable to treatment only to such degree that discharges from the sewage treatment plant or on-site wastewater systems cannot meet the requirements of agencies having jurisdiction over disharge to the receiving waters.

Section 5. If any waters or wastes are disharged or are proposed to be discharged to the public sewers or on-site wastewater systems, which waters contain the substances or possess the characteristics enumerated in Section 4 of this Article, and/or which are in violation of the standards for pretreatment provided in 40 CFR 403, June 26, 1978, and any amendments thereto, and which in the judgment of the _____ may have a
(Approving Authority)

deleterious effect upon the sewage works, processes, equipment, or receiving waters, or which otherwise create a hazard to life or constitute a public nuisance, the

_____ may:
(Approving Authority)

(a) reject the wastes;

(b) require pretreatment to an acceptable condition for discharge to the public sewers or on-site wastewater systems;

(c) require control over the quantities and rates of discharge; and/or

(d) require payment to cover the added costs of handling and treating the wastes not covered by existing taxes or sewer charges, under the provisions of Section 11 of this Article.

If the _____ permits the
(Approving Authority)

pretreatment or equalization of waste flows, the design and installation of the plants and equipment shall be subject to the review and approval of the

_____, and subject to the
(Approving Authority)

requirements of all applicable codes, ordinances, and laws.

Section 6. Grease, oil, and sand interceptors shall be provided

when, in the opinion of the _____
(Approving Authority)

they are necessary for the proper handling of liquid wastes containing grease in excessive amounts, or any flammable wastes, sand, or other harmful ingredients; except that such interceptors shall not be required for private living quarters or dwelling units. All interceptors shall be of a type and capacity approved by

the _____, and shall be
(Approving Authority)

located as to be readily and easily accessible for cleaning and inspection.

Section 7. Where preliminary treatment or flow-equalizing facilities are provided, they shall be maintained continuously in satisfactory and effective operation by the owner at his expense.

Section 8. Each industry shall be required to install a control

manhole and, when required by the _____,
(Approving Authority)

the owner of any property serviced by a building sewer carrying industrial wastes shall install a suitable control manhole together with such necessary meters and other appurtenances in the building sewer to facilitate observation, sampling, and measurement of the wastes. Such manhole, when required, shall be accessibly and safely located, and shall be constructed in accordance

with plans approved by the _____.
(Approving Authority)

The manhole shall be installed by the owner at his expense, and shall be maintained by him so as to be safe and accessible at all times.

Section 9. The owner of any property serviced by a building sewer carrying industrial wastes shall provide laboratory measurements, tests, and analyses of waters and wastes to illustrate compliance with this ordinance and any special conditions for discharge established by the

_____ or regulatory agencies
(Unit of Government)

having jurisdiction over the discharge.

The number, type, and frequency of laboratory analyses to be performed by the owner shall be as stipulated by

the _____, but no less than once
(Unit of Government)

per year the industry must supply a complete analysis of the constituents of the wastewater discharge to assure that compliance with the Federal, State, and local standards are being met. The owner shall report the results of measurements and laboratory analyses to the

_____ at such times and in such a
(Unit of Government)

manner as prescribed the the _____.
(Unit of Government)

The owner shall bear the expense of all measurements, analyses, and reporting required by the

_____. At such times as deemed
(Unit of Government)

necessary, the _____ reserves the
(Unit of Government)

right to take measurements and samples for analysis by an outside laboratory service.

Section 10. All measurements, tests, and analyses of the characteristics of waters and wastes to which reference is made in this ordinance shall be determined in accordance with the latest edition of Standard Methods for the Examination of Water and Wastewater and shall be determined at the control manhole provided, or upon suitable samples taken at said ontrol manhole. In the event that no special manhole has been required, the control manhole shall be considered to be the nearest

downstream manhole in the public sewer to the point at which the building serwer is connected. Sampling shall be carried out by customarily accepted methods to reflect the effect of constituents upon the sewage works and to determine the existence of hazards to life, limb, and property. The particular analyses involved will determine whether a twenty-four (24) hour composite of all outfalls of a premise is appropriate or whether a grab sample or samples should be taken. Normally, but not always, BOD and suspended solids analyses are obtained from 24-hour composites of all outfalls, whereas pH's are determined from periodic grab samples.

Section 11. No statement contained in this Article shall be construed as preventing any special agreement or arrangement

between the _____
(Unit of Government)

and any industrial concern whereby an industrial waste of unusual strength or character may be accepted by the

_____ for treatment, subject to
(Unit of Government)

payment therefore, in accordance with Ordinance No. ___ (the user charge rate ordinance) by the industrial concern provided such payments are also in accordance with Federal and State guidelines for User Charge System.

Article 6. Protection of Sewage Works from Damage

Section 1. No unauthorized person shall maliciously, willfully, or negligently break, damage, destroy, or tamper with any structure, appurtenance, or equipment which is a part of the sewage works, including on-site wastewater systems which are under the responsibility of _____.
(Unit of Goverment)

Any person violating this provision shall be subject to immediate arrest under charge of disorderly conduct.

Article 7. Powers and Authority of Inspectors

Section 1. The _____ and other duly
(Approving Authority)

authorized employees of the _____
(Unit of Government)

or the Illinois Environmental Protection Agency, bearing proper credentials and identification, shall be permitted to enter all properties for the purposes of inspection, observation, measurement, sampling, and testing in accordance with the provisions of this ordinancce. The _____ or his representative shall
(Approving Authority)

have no authority to inquire into any processes, including metallurgical, chemical, oil refining, ceramic, paper, or other industries beyond that point having a direct bearing on the kind and source of discharge to the sewers or waterway or facilities for waste treatment.

Section 2. While performing the necessary work on private properties referred to in Article 7, Section 1 above, the

_____ or duly authorized employees
(Approving Authority)

of the _____, the Illinois
(Unit of Government)

Environmental Protection Agency, and the U.S. Environmental Protection Agency shall observe all safety rules applicable to the premises established by the property owner and the owner shall be held harmless for injury or death to the _____ employees
(Unit of Government)

and the _____ shall indemnify the
(Unit of Government)

company against liability claims and demands for personal injury or property damage asserted against the owner and growing out of the gauging and sampling operation, except as such may be caused by negligence or failure of the owner to maintain conditions as required in Article 5, Section 8.

Section 3. The _____ and other duly authorized
(Approving Authority)

employees of the _____ bearing
(Unit of Government)

proper credentials and identification shall be permitted to enter all private properties within the Municipal Disposal Zone or through which the _____
(Unit of Government)

holds a duly negotiated easement for thepurposes of, but not limited to, inspection, observation, measurement, sampling, repair, and maintenance of any portion of the sewage works lying within said easement. All entry and subsequent work, if any, on said private property shall be done in full accordance with the terms of Ordinance ___ (the ordinance forming a municipal disposal zone) or the duly negotiated easement pertaining to the private property involved.

Article 8. Penalties

Section 1. Any person found to be violating any provision of this ordinance except Article 6 shall be served by the

_____ with written notice
(Unit of Government)

stating the nature of the violation and providing a reasonable time limit for the satisfactory correction thereof. The offender shall, within the period of time stated in such notice, permanently cease all violations.

The _____ may revoke any permit for
(Unit of Government)

sewage disposal as a result of any violation of anh provision of this ordinance.

Section 2. Any person who shall continue any violation beyond the time limit provided for in Article 8, Section 1, shall be guilty of a misdemeanor, and on conviction thereof shall be fined in the amount not exceeding _____ dollars for each violation. Each day in which any such violation shall continue shall be deemed a separate offense.

Section 3. Any person violating any of the provisions of this ordinance shall become liable to the

_____ by reaons of such
(Unit of Government)

violation.

Article 9. Validity

Section 1. All ordinances or parts of ordinances in conflict herewith are hereby repealed.

Section 2. The invalidity of any section, clause, sentence, or provision of this ordinance shall not affect the validity of any other part of this ordinance which can be given effect without such invalid part or parts.

Article 10. Ordinance in Force

Section 1. This ordinance shall be in full force and effect from and after its passage, approval, recording, and publication as provided by law.

Section 2. Passed and adopted by the _____ of
(Council, Board, etc.)

the _____ of _____,
(Unit of Government)

State of _____ on the _____ day of

_____, _____.
(Month) (Year)

Approved:

(Signed) _____
(Mayor, Village President, etc.)

Attest:

(Signed) _____
(Clerk, Secretary, etc.)

APPENDIX 1

APPLICATIONS FOR SEWER PERMITS

a) Residential or Commercial Building Sewer

b) On-Site Wastewater System

c) Industrial Sewer

RESIDENTIAL BUILDING SEWER APPLICATION

To the _____ (City, Village, etc.) of _____:

A. THE UNDERSIGNED, being the _____ (Owner, Owner's Agent) property located at _____ (Number) _____ (Street) DOES HEREBY REQUEST a permit to install and connect a building to serve the _____ (Residence) at said location.

1. The following indicated fixtures will be connected to the proposed building sewer:

Number	Fixtures	Number	Fixtures
_____	Kitchen Sinks	_____	Water Closets
_____	Lavatories	_____	Bath Tubs
_____	Laundry Tubs	_____	Showers
_____	Urinals	_____	Garbage Grinders

Specify other fixtures _____.

2. The maximum number of persons who will use the above fixtures is _____.

3. The name and address of the person or firm who will perform the proposed work is _____.

4. Plans and specifications for the proposed building sewer are attached hereunto as Exhibit "A".

B. In consideration of the granting of this permit, THE UNDERSIGNED AGREES:

1. To accept and abide by all provisions of the _____ (City, Village, etc.) Code of the _____ (City, Village, etc.) of _____, and of all othe pertinent ordinances or regulations that may be adopted in the future.

2. To maintain the building sewer at no expense to the _____ (City, Village, etc.).

3. To notify the _____ (Approving Authority) when the building sewer is ready for inspection and connection to the public sewer, but before any portion of the work is covered.

DATE: _____ SIGNED: _____
(Applicant)

_____
(Address of Applicant)

_____
(Certification by _____ Treasurer)
(City, Village, etc.)

$ _____ connection fee paid.

$ _____ inspection fee paid.

Application approved and permit issued:

DATE: _____ SIGNED: _____
(Approving Authority)

ON-SITE WASTEWATER SYSTEM

To the _____ of _____:
(City, Village, etc.)

A. THE UNDERSIGNED, being the _____
(Owner, Owner's Agent)

of the property located at _____
Number Street

DOES HEREBY REQUEST a permit to install on-site wastewater facilities to serve the _____
(Residence, Commercial Building, etc.)

location.

1. The proposed facilities include: _____

_____

to be constructed in complete accordance with the plans and specifications attached hereunto as Exhibit "A".

2. The following indicated fixtures will be connected to the proposed on-site wastewater system:

Number	Fixtures	Number	Fixtures
_____	Kitchen Sinks	_____	Water Closets
_____	Lavoratories	_____	Bath Tubs
_____	Laundry Tubs	_____	Showers
_____	Urinals	_____	Garbage Grinders

Specify other fixtures _____.

3. The area of the property is _____ square feet (or _____ square meters).

4. The name and address of the person to be served by the proposed facilities is _____.

5. The maximum number of persons to be served by the proposed facilities is _____.

6. The number of bedrooms to be served by the proposed facilities is _____.

7. The name and address of the person who will install the proposed facilities is _____.

8. The locations and nature of all sources of private or public water supply within the one hundred (100) feet (30.5) meters of any boundary of said property are shown on the plat attached hereunto as Exhibit "B".

B. In consideration of the granting of this permit, THE UNDERSIGNED AGREES:

1. To furnish any additional information relating to the proposed work that shall be requested by the _____. (Approving Authority)

2. To accept and abide by all provisions of the _____ (City, Village, etc.) Code, of the _____ (City, Village, etc.) of _____ and of all other pertinent ordinances or regulations that may be adopted in the future.

3. To operate and maintain the on-site wastewater system covered by this application in a sanitary manner at all times and in compliance with all requirements of the _____. (City, Village, etc.)

4. To notify the _____ at least twenty-four (24)
(Approving Authority)

hours prior to commencement of the work proposed, and again at least twenty-four (24) hours prior to the covering of any underground portions of the installation.

DATE: _____ SIGNED: _____
(Applicant)

_____
(Address of Applicant)

$ _____ inspection fee paid.

_____

(Certification by _____ Treasurer)
(City, Village, etc.)

Application approved and permit issued:

DATE: _____ SIGNED: _____
(Approving Authority)

COMMERCIAL, INSTITUTIONAL/GOVERNMENTAL, AND INDUSTRIAL SEWER CONNECTION APPLICATION

To the _____ of _____:
(City, Village, etc.)

A. THE UNDERSIGNED being the _____ of the
(Owner, Lessee, Tenant, etc.)

property located at _____

DOES HEREBY REQUEST a permit to _____ an industrial
(Install, Use)

sewer connection serving the _____
(Name of Company)

which company is engaged in _____ at said

location.

1. A plat of the property showing accurately all sewers and drains now existing is attached hereunto as Exhibit "A".

2. Plans and specifications covering any work proposed to be performed under this permit is attached hereunto as Exhibit "B".

3. A complete schedule of all process waters and industrial wastes produced or expected to be produced at said property, including a description of the character of each waste, the daily volume and maximum rates of discharge, and representative anlayses, is attached hereunto as Exhibit "C".

4. The name and address of the person or firm who will perform the work

covered by this permit is _____

_____.

B. In consideration of the granting of this permit, the UNDERSIGNED AGREES:

1. To furnish any additional information relating to the installion or use of the industrial sewer for which this permit is sought as may be adopted in the future.

2. To operate and maintain a control manhole and any waste pretreatment facilities, as may be required as a condition of the acceptance into the public sewer of the industrial wastes involved in an efficient manner at all

times, and at no expense to the _____.
(City, Village, etc.)

3. To cooperate at all times with the _____, and
(Approving Authority)

his representative in their inspecting, sampling, and study of the industrial wastes, and any facilities provided for pretreatment.

4. To notify the _____ immediately in event of any
(Approving Authority)

accident, negligence, or other occurence that occasions discharge to the public sewers of any wastes or process waters not covered by thid permit.

DATE: _____ SIGNED: _____
(Applicant)

_____
(Address of Applicant)

_____

(Certification by _____ Treasurer)
(City, Village, etc.)

$ _____ connection fee paid.

$ _____ inspection fee paid.

Application approved and permit granted:

DATE: _____ SIGNED: _____
(Approving Authority)

APPENDIX E-3

MODEL ORDINANCE TO REGULATE PLANNED CLUSTER SYSTEMS

Unlike retrofit clusters which are usually constructed under municipal or other public responsibility, planned clusters will usually be planned and constructed under the responsibility of a private developer. The responsibility for regulation of planned cluster systems normally rests with the local health department and zoning authorities.

The model ordinance presented at the end of this section has been written in a form to be used by a county board, where the county health department has the primary responsibility for regulating private sewage disposal systems. In most cases, use of planned clusters could also require revisions in subdivision and zoning ordinances as well.

The model ordinance has been patterned after the one recommended by the Illinois Department of Public Health (IDPH) for regulating private sewage disposal with appropriate revisions to accommodate use of cluster systems. As written, the ordinance would apply to all planned cluster systems which fall under the jurisdiction of the IDPH. Planned clusters serving over 15 P.E. and having surface discharges would fall under the regulatory jurisdiction of Illinois Environmental Protection Agency (IEPA) and would be subject to similar requirements developed by that agency for regulating use of planned cluster systems.

In general, the suggested ordinance should not be used directly with only the blanks filled in. Rather, each article and section should be reviewed with respect to the particular needs of the local community.

When a proposed ordinance has been drafted to the satisfaction of the corporation counsel, engineering consultant, and other local authorities, it should be submitted to the Illinois Environmental Protection Agency (IEPA), Illinois Department of Public Health, or other appropriate regulatory agency for their review prior to enactment. This should reveal any possible conflicts with state and federal requirements.

To assist in using and interpreting the model ordinance, the following paragraphs explain the purpose and some of the more important considerations for each section in the model ordinance.

Article 1. Definitions

A well-written ordinance should include defintions of technical terms and phrases which may have more than one interpretation. The model ordinance includes most of the important definitions; others may be desirable in certain situations.

This article typically appears at the beginning of an ordinance, but some municipalities may prefer to place definitions at the end of the ordinance to be consistent with past practice.

Article 2. Adoption by Reference

This article incorporates the provisions of the IDPH Private Sewage Disposal Licensing Act and Code without reiterating those provisions in the local ordinance.

Article 3. Permits and Approvals

The permit requirements ensures that the Health Department has an opportunity to review, inspect, and approve new wastewater systems under their jurisdiction. The permit application requirements in Section 4 could be replaced by an actual application form as was included with the model sewer use ordinance. In Section 5, the key word is "may." This means that the Health Department can either approve or disapprove an application for private sewage disposal under these circumstances, depending on what is most consistent with the overall wastewater plans and needs of the area. In Section 6, the application review time was increased from 15 to 30 days. This may still be too short for a large wastewater cluster system. Another approach would be to specify two different review times for individual and cluster systems. Sections 8 and 9 require the proposed wastewater system to be defined prior to platting a new subdivision. This is essential because different requirements for easements and lot size would apply for cluster systems than for individual systems.

Article 4. Minimum Requirements

The minimum lot size may be adjusted from the value shown depending on percolation rates and desired density levels. The wording in Section 2 provides the same population density for clusters as for individual systems, but allows flexibility for smaller home sites and larger open spaces or "commons," including the areas used for wastewater treatment and disposal. Section 3 applies equally to individual and cluster systems where subsurface disposal is used. Section 4 includes the major additional provisions necessary to ensure adequate operation and maintenance of a cluster system.

Article 5. Sludge Disposal

The purpose of this article is to prevent unauthorized or improper disposal of sludge from routine cleaning of septic tanks or other wastewater facilities. Additional restrictions on sludge disposal are imposed by IDPH and IEPA.

Article 6. Contractor's Registration

The requirement for registration reduces the likelihood of private sewage systems being installed improperly by unqualified persons, and helps offset the cost of regulating private systems. These provisions parallel the state licensing requirements.

Article 7. Compliance and Enforcement

This article provides the right of access to private property for inspection purposes and requires inspection of any underground facilities prior to backfilling. The specific consequences of non-compliance have not been included since such actions would be considered a violation subject to the penalty provisions in Article 8.

Article 8. Penalties

This article is essential to provide a mechanism for enforcing the ordinance. Section 4 allows for levying fines without prior written notice of violations. This power would be invoked only in cases where violations were obvious and/or willful.

Article 9. Validity, and

Article 10. Ordinance in Force

These are standard provisions of any ordinance, and should be modified as necessary to be consistent with the normal wording and format used by each county.

MODEL ORDINANCE

Ordinance Number ___

An ordinance regulating private sewage disposal systems, the construction and/or reconstruction of such systems, and requiring an annual registration certificate for private sewage disposal system contractors in _____ County and the incorporated areas of _____ County, Illinois.

NOW THEREFORE, be it ordained and enacted by the County Board of _____ County, Illinois, that:

Article 1. Definitions

Unless the context specifically indicates otherwise, the meaning of terms used in this ordinance shall be as provided in this article.

Section 1. "Authorized Representative" shall mean the legally designated Administrator or the Acting Administrator of the _____ County Health Department and shall include those persons designated by the Administrator or Acting Administrator to enforce the provisions of this Ordinance.

Section 2. "Board of Health" shall mean the _____ County Board of Health or its Authorized Representative(s).

Section 3. "Cluster Sewage Disposal System" shall mean a private sewage disposal system which serves more than one residence, business, or other wastewater source.

Section 4. "Domestic Sewage" means wastewater derived principally from dwellings, business or office buildings, institutions, food service establishments, and similar facilities.

Section 5. "Health Authority" shall mean the person or persons who have been designated by the Board of Health to administer the affairs of the Health Department.

Section 6. "Health Department" shall mean the _____ County Health Department, an agency of the _____ County Board of Health.

Section 7. "Homeowner" means a person who holds legal or equitable title to a residential structure which is to be used or is used for his personnel, single family residence.

Section 8. "Homeowner Installed System" means a private sewage disposal system installed by a homeowner for his personal single family residence.

Section 9. "Human Wastes" means undigested food and by-products of metabolism which are passed out of the human body.

Section 10. "Individual Sewage Disposal System" shall mean a private sewage disposal system which serves only one residence, business, or other single wastewater sources.

Section 11. "Modify" shall mean any change in the design or components of a private sewage disposal system requiring a permit herein defined.

Section 12. "Person" means any individual, group of individuals, association, trust, partnership, corporation, person doing business under an assumed name, the State of Illinois, or any Department thereof, or any other entity.

Section 13. "Permit" shall mean a written permit issued by the Board of Health or its authorized representative permitting the construction of a private sewage disposal system under this Ordinance.

Section 14. "Population Equivalent" means an average waste loading, equivalent to that amount of waste produced by one person which is defined as 100 gallons per day or that amount of waste containing 0.17 pounds BOD_5.

Section 15. "Private Sewage Disposal System Contractor" means any person engaged in the business of constructing, installing, maintaining, servicing, or cleaning private sewage disposal systems or the hauling or disposal of wastes removed therefrom. This definition shall include any person who repairs or reconstructs a segment of a private sewage disposal system.

Section 16. "Private Sewage Disposal System Contractor's Registration" shall mean an annual Registration Certificate issued by the _____ County Health Department to all private sewage disposal contractors engaged in the installation and/or servicing of private sewage disposal systems within the limits of _____ County.

Section 17. "Private Sewage Disposal System" means any sewage handling or treatment facility receiving domestic sewage from less than 15 people or population equivalent and having a ground surface discharge or any sewage handling or treatment facility receiving domestic sewage and having no ground surface discharge.

Section 18. "Property Owner" means the person in whose name legal title to the real estate is recorded.

Section 19. "Waste" means either human waste or domestic sewage, or both.

Article 2. Adoption by Reference

Section 1. This Ordinance shall be interpreted and enforced in accordance with provisions set forth in the latest edition of the State of Illinois Private Sewage Disposal Licensing Act and Code, three copies of which shall be on file in the office of the _____ County Clerk.

Article 3. Permits and Approvals

Section 1. It shall be unlawful for any person to construct, alter, or extend private sewage disposal systems within _____ County unless he holds a valid permit issued by the Health Department stating the name of such person for which the specific construction, alteration, or extension is proposed. Said permit shall indicate a maximum permissible waste loading for the proposed disposal system.

Section 2. All applications for permits granted under the provision of this Ordinance shall be made to the Board of Health or its duly Authorized Representative. Sufficient data shall be included to allow review and to determine whether the proposed application for permit meets the requirements of this Ordinance.

Section 3. A permit shall only be issued to a homeowner installing an individual sewage disposal system or to an Illinois licensed private sewage disposal system contractor installing a private sewage disposal system.

Section 4. Permit application forms provided by the Health Department shall be completed and signed by each applicant and shall include as a minimum the following information:

1) Name and address of the applicant and location of the proposed site(s) of construction, alteration, or extension as proposed.

2) Complete plan of the proposed disposal system with substantiating data, if necessary, attesting to its compliance with the minimum standards of this Ordinance.

3) Such other information as may be required by the Health Authority to substantiate that the proposed construction, alteration, or extension complies with all requirements of this Ordinance.

Section 5. The Board of Health or its Authorized Representative may refuse to grant a permit for the construction of a private sewage disposal system where public or community sewage systems are available. A sewer shall be deemed available when a public sewer line is in place within any street, alley, right of way, or easement that adjoins or abuts the premises for which the permit is requested, or when the improvement to be served is located within a reasonable distance of a public sewer to which a connection is practical and is permitted by the controlling authority for the sewer. A reasonable distance for the purpose of this provision shall be deemed to be not greater than 300 feet for a single family residence and not greater than 1,000 feet for a commercial establishment, subdivision, or multi-family dwelling.

Section 6. The Board of Health or its authorized Representative shall act upon all permit applications within 30 days of receipt thereof.

Section 7. Said permit to construct is valid for a period of six months from date of issuance. If construction has not started within this period, the permit is void.

Section 8. Prior to approval of a proposed subdivision plat under Ordinance No. ___ (the County Zoning Ordinance), the Health Department shall require subdividers to furnish soil absorption capacities and other pertinent information or shall require changes in a proposed subdivision plat, as may be necessary to reasonably ascertain that the wastewater treatment and disposal needs of each lot in the proposed subdivision can be properly met either by an existing public wastewater treatment system or by construction and use of an approved private sewage disposal system as defined in the Illinois Private Sewage Disposal Licensing Act and Code.

Section 9. Based on the information submitted under Article 3, Section 8, of this Ordinance, the Health Department shall certify that the wastewater treatment and disposal needs of each lot in the proposed subdivision can be properly met. Such certification shall:

1) Be in writing;

2) Include a statement as to any restrictions relating to the type or size of system that can be installed;

3) Be on file at the Health Department and be available for review to all interested persons;

4) Be supplied by the subdivider, developer, or their agents upon request to a prospective purchaser of a lot in that proposed subdivision.

Section 10. The Health Department shall be notified of any modification, change, or repair to any private sewage disposal system by either a home owner or contractor to determine whether that modification, change, or repair requires a permit as set forth in Section 1 of this Article. The routine cleaning of disposal system components, replacing septic tank cover, or rodding out inlets and outlets, does not require a construction permit as defined under this Article.

Section 11. A permit fee of _____ dollars for any individual wastewater disposal system or _____ dollars for any cluster wastewater disposal system shall be paid to the County _____ at the time the application is filed.
(Clerk, Treasurer, etc.)

Article 4. Minimum Requirements

Section 1. The minimum lot size for a home requiring an individual sewage disposal system shall be twenty thousand (20,000) square feet excluding easements. Lots platted and on record before the effective date of this ordinance that are smaller than required will be given special consideration when applying for a permit.

Section 2. The minimum total area required for a group of lots served by a cluster sewage disposal system shall be twenty thousand (20,000) square feet times the number of lots serviced, excluding easements other than those provided for the cluster system. Subdivisions platted and on record before the effective date of this ordinance that do not meet this requirement will be given special consideration when applying for a permit.

Section 3. Prior to issuance of any permit for any private sewage disposal system using subsurface disposal, percolation tests shall be performed according to the provisions of the Illinois Private Sewage Disposal Licensing Act and Code adopted hereinafter by reference. Percolation tests may be performed by private sewage disposal system contractors holding a valid _____ County Registration Certificate, as person given written permission by the Health Department, or the authorized representative of the Health Department. The Health Department reserves the right to determine the validity of any test and in cases where more than one test is performed, the Health Department shall determine which test results shall prevail. The Health Department shall be notified at least one day prior to the performance of all tests and may supervise any test.

Section 4. In addition to the requirements of Sections 2 and 3 of this Article 4, proposed cluster sewage disposal systems shall be subject to the following additional requirements:

1) For cluster systems employing components on private property, documentation that easements have been provided to assure adequate rights of access for operation, maintenance, and replacement of these components.

2) Documentation that a designated management authority has been established which will be responsible for the operation, maintenance, and replacement of the cluster system;

3) Documentation that an adequate financing system has been established to support the cost of operation, maintenance, and replacement of the system.

4) Documentation that subdivision regulations or agreements have been established which define reasonable restrictions on use of the cluster system and discharges thereto, and which define the separate responsibilities of the individual homeowners and designated management authority.

5) For cluster systems employing subsurface disposal, additional documentation of subsurface conditions as may be necessary for the Health Department to reasonably ascertain the adequacy of the proposed disposal site, including soil borings and a characterization of the shallow groundwater in the area of the proposed subsurface disposal site.

Article 5. Sludge Disposal

Section 1. All sites used for the disposal of sludge from private sewage disposal systems within _____ County shall be inspected by the Health Department to determine compliance with the provisions of this Ordinance. If any disposal site is determined to be unacceptable, the Health Department shall issue written notices to the users and owners of that site informing them that the site shall not be used for disposal of sludge.

Section 2. A contractor or homeowner servicing his personal residence system shall supply a list of all sludge disposal sites utilized by either the contractor or homeowner to the Health Department.

Article 6. Contractor's Registration

Section 1. An annual contractor's registration fee of _____ dollars shall be required for all Private Sewage Disposal System Contractors operating within the limits of _____ County. The Health Department shall issue a private sewage disposal contractor's registration certificate to persons applying for such certificate who comply with the minimum performance standards as set forth in this Ordinance, and who pay the required annual registration fee of ____ dollars which shall be deposited in the _____ County Health Department Fund. All such registration certificates shall expire one year from the date of issuance.

Section 2. The minimum performance standards for private sewage disposal system contractors and for a homeowner who installs an individual sewage disposal system for his personal residence shall be the same as the minimum performance standards promulgated under authority granted in the current Illinois Private Sewage Disposal Licensing Act and Code.

Article 7. Compliance and Enforcement

Section 1. All private sewage disposal systems within the limits of _____ County shall be installed and/or serviced by Illinois licensed private sewage disposal system contractors; provided, however, that a homeowner may install and/or service an individual sewage disposal system which serves his own personal residence.

Section 2. The Board of Health or its Authorized Representative is hereby authorized and directed to make such inspections as are necessary to determine satisfactory compliance with this Ordinance.

Section 3. The owner or occupant of a property is required to give the Board of Health or its Authorized Representative access to the property at reasonable times for the purpose of making such inspections as are necessary to determine compliance with the requirements of this Ordinance.

Section 4. Any private sewage disposal system which has been installed following issuance of a permit under Article 3 of this ordinance shall not be covered or placed in operation until the said installation shall have been inspected and written approval of the said system shall have been issued by the Health Department. The inspection shall be made within ___ hours of the receipt of written notice by the Authorized Representative.

Article 8. Penalties

Section 1. Any person who violates any provision of this ordinance shall be guilty of a Class B misdemeanor and shall be fined a sum of not less than $100.00. Each day in which any such violation continues shall constitute a separate offense.

Section 2. Any person violating any provison of this ordinance shall become liable to _____ County by reason of such violation(s), and all monies collected from fines shall be deposited in the _____ County Health Department Fund.

Section 3. Whenever the Health Department determines that a violation of any provision of this Ordinance has occurred, the Health Department shall give notice to the person responsible for such violation. This notice shall:

1) Be in writing;

2) Include a statement of the reasons for issuance of the notice;

3) Allow reasonable time as determined by the Health Department for performance of any act it required;

4) Be served upon the person responsible for the violation(s); provided that such notice shall have been properly served upon the person responsible for the violations when a copy thereof has been sent by registered or certified mail to his last known address as furnished to the Health Department or when he has been served with such notice by any other method authorized by laws of this State; and,

5) Contain an outline of remedial action whih is required to effect compliance with this Ordinance.

Section 4. It shall not be a prerequisite to enforcement of the penalty provisions of this Ordinance that the Health Department first resort to the notice procedure set forth in Section 3 of this Article 8.

Article 9. Validity

Section 1. In any case where a provision of this Ordinance is found to be in conflict with a provision of any zoning, building, fire, safety, or health ordinance, or code of _____ County existing on the effective date of this Ordinance, the provision which, in the judgment of the Health Authority, establishes the higher standard for the promotion and protection of the health and safety of the people shall prevail. In any case where a provision of any other ordinance or code of _____ County existing on the effective date of this Ordinance which established a lower standard for the promotion and protection of the health and safety of the people, then provisions of this Ordinance shall be deemed to prevail, and such other ordinance or codes are hereby declared to be repealed to the extent that they may be found in conflict with this Ordinance.

Section 2. If any section, subsection, paragraph, sentence, clause, or phrase of this Ordinance should be declared invalid for any reason whatsoever, such decision shall not affect the remaining portions of this Ordinance which shall remain in full force and effect and, to this end, the provisions off this Ordinance are hereby declared to be severable.

Article 10. Ordinance in Force

Section 1. This ordinance shall be in full force and effect from and after its passage, approval, recording, and publication as provided by law.

Section 2. Passed and adopted by the _____ County Board, State of Illinois, on this _____ day of _____, _____.
(Month) (Year)

APPROVED:

(Signed) _____
County Board Chairman

(County Seal)

ATTEST:

(Signed) _____
County Clerk

The model ordinances which have been presented in Appendices E-1 through E-3 will also be printed separately and are available upon request from either of the following:

1. Illinois Environmental Protection Agency
   Water Pollution Control Division
   2200 Churchill Road
   Springfield, IL 62706
   Telephone (217)-782-2027

2. Illinois Department of Public Health
   Engineering and Sanitation Division
   535 West Jefferson Street
   Springfield, IL 62761
   Telephone (217)-782-4977

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7. Author(s) Richard B. Helm, James E. Quinn, Walter Zyznieuski

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Randolph and Associates, Inc.
8901 N. Industrial Road
Peoria, Illinois 61615

10. Project/Task/Work Unit No.

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325 W. Adams
Springfield, Illinois 62706

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15. Supplementary Notes

16. Abstract (Limit: 200 words)

Wastewater cluster systems are an intermediate wasterwater collection/treatment option between individual on-site systems and conventional centralized systems. These systems appear to be the most cost effective wastewater management approach in some circumstances, but their use has been limited in Illinois because existing legal, planning, and regulatory frameworks are not oriented toward use of clusters.

This report describes cluster system technology, applicable laws and regulations, management of cluster systems and key issues associated with clusters, including engineering, public health, economic, legal, and land use considerations. Suggestions are made to streamline the planning, management and regulation of cluster systems so that these systems may be more easily implemented in appropriate circumstances in the State of Illinois.

17. Document Analysis a. Descriptors

Waste Treatment
Waste Water
Waste Disposal
Water Pollution
Water
Illinois

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group 1302

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